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A Glossary of Mining Terms

United States Forest Service
Region 5

A Glossary of Mining Terms



THE MINER

... he turns the river from its ancient bed, and hangs it, for miles together, in wooden flumes upon the mountain's side, or throws it from hill to hill, in aqueducts that tremble at their own airy height; or he pumps a river dry, and takes its golden bottom out.

OLMSTED 1962

Compiled by

Mary Luecke

Brian Power

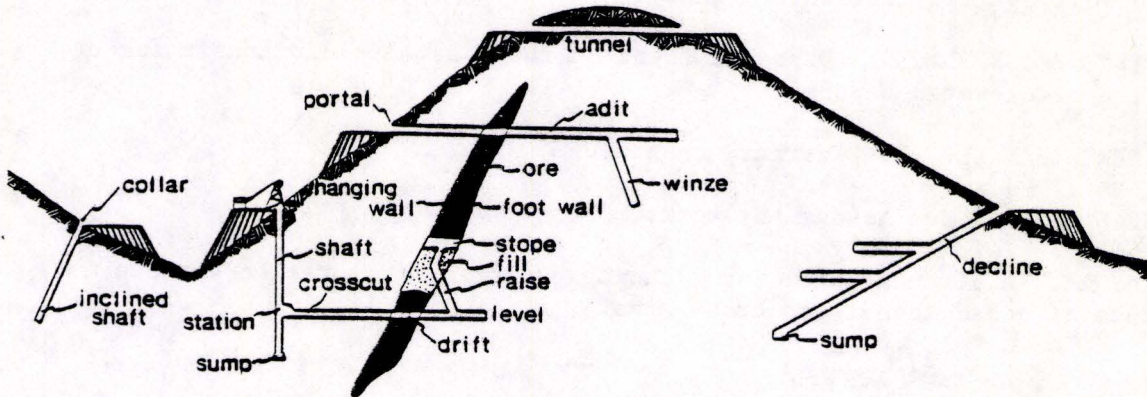
Jim Rock

Klamath National Forest

Region 5

USDA

ADIT. A mostly horizontal passage driven from the surface for the working of a mine. An adit has only one opening. This fact distinguished it from a tunnel, which has two openings.



Anatomy of a Mine from Prospect to Production. Intermountain Forest and Range Experiment Station, Forest Service, USDA, Ogden, Utah.

AINLAY BOWL. A gravity concentrator used for the recovery of gold and other heavy minerals from alluvial materials.

ALLUVIAL. Materials deposited by a stream.

ALLUVIAL FAN. A cone-shaped deposit of alluvium made by a stream where it runs out onto a plain or meets a slower stream. The fans generally form where streams issue from mountains into lowlands.

ALLUVIAL GOLD. Gold located in association with water-worn material.

ALLUVIAL PLAIN. Flood plains produced by the filling of a valley bottom are alluvial materials that consist of fine mud, sand, or gravel.

ALLUVIUM. A general term for all detrital deposits resulting from modern rivers, thus including the sediments laid down in river beds, flood plains, lakes, fans at the foot of mountain slopes, and estuaries.

AMALGAM. An alloy of mercury with gold or another metal. In the case of placer gold, a "dry" amalgam, one from which all excess mercury has been removed by squeezing through chamois leather will contain nearly equal proportions of gold and mercury.

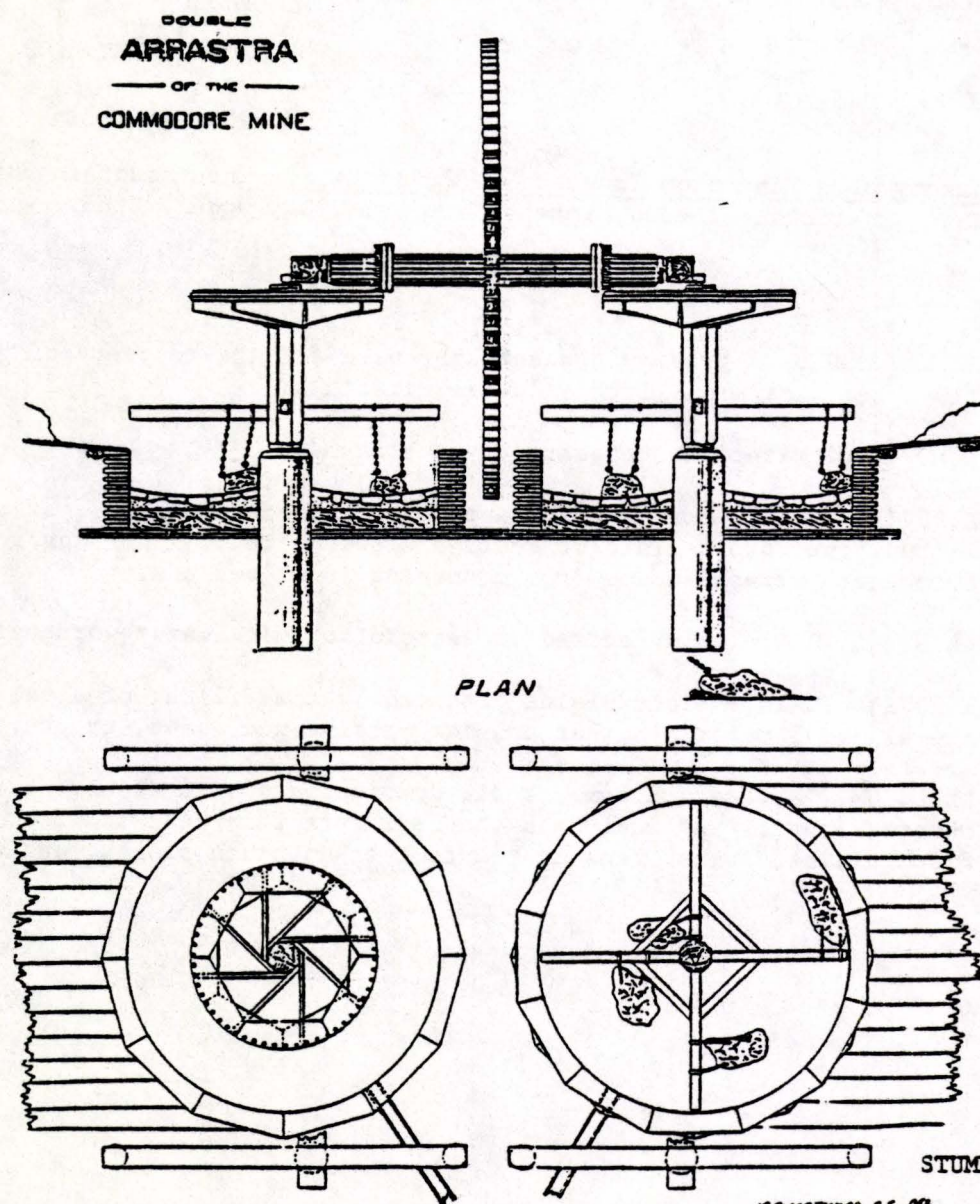
AMALGAMATION. The extraction of the precious metals from their parent materials by treatment with mercury.

ANCIENT BEACH PLACER. Deposits found on the coastal plain consisting of a line of elevated beaches.

ANCIENT CHANNEL. See Tertiary channel.

ANNUAL LABOR. See Assessment work.

ARRASTRA. A circular mill for grinding quartz by trituration between stones attached loosely to cross arms.



ASSAY (verb). To determine the amount of metal contained in an ore.
1. The act of making such a determination. 2. The result of such a determination.

ASSAY VALUE. The amount of gold or silver, contained in an ore or other material, as shown by assay of any given sample.

ASSOCIATION PLACER. A placer location taken up by 2 to 8 persons and containing 40 to 160 acres. It is not a group of several claims but a single claim and requires only one discovery, and only \$100 a year assessment work. However, each person in such claim must be a bona fide locator and not simply loan the use of his name for the purpose of circumventing the law.

ASSESSMENT WORK (ANNUAL LABOR). Annual work upon an unpatented mining claim necessary for the maintenance of the possessory title.

AURIFEROUS. Containing gold.

BAJADA PLACER. Placers found in confluent alluvial fans along the base of a mountain range or in a mantle of rock debris along the lower slope of a mountain range, in arid regions. The deposits are mainly residual detritus and poorly sorted alluvium found in gulches and on slopes that are subject to occasional torrential rain wash. Bajada is the Spanish term for slope. This term has not found general use in placer mining, most bajada placers being referred to collectively as "Desert" placers.

BANK-MEASURE. The measurement of material in place, such as gravel in a deposit before excavation. In placer work, values are normally reported as cents per cubic yard and unless specified otherwise, this means a cubic yard in place, or bank-measure.

BANKA DRILL. A placer drill consisting essentially of a flush-jointed casing equipped with a serrated cutting shoe. The casing is rotated by means of a man or animal-powered sweep attached to the upper section. Men standing on an attached platform, chop up the drill core and remove it from the casing by means of hand-powered tools. Also known as an EMPIRE DRILL.

BAR. A deposit of alluvial material above or below the water line of present streams. Bars are found where the current slackens or changes direction.

BED LOAD. Soil, rock particles, or other debris rolled along the bottom of a stream by the moving water, as contrasted with the "silt load" carried in suspension.

BEDROCK. The solid rock underlying auriferous gravel, sand, clay, etc., and upon which the alluvial gold rests. In placer use, the term bedrock may be generally applied to any consolidated formation underlying the gold-bearing gravel. Bedrock may be composed of igneous, metamorphic or sedimentary rock. See - False bedrock.

BENCH PLACER. Gravel deposits in ancient stream channels and flood plains which stand from 50 to several hundred feet above the present streams.

BLACK GOLD. Alluvial gold coated by black oxide of manganese.

BLACK SAND. Heavy grains of various minerals which have a dark color, and are usually found accompanying gold in alluvial deposits. The heavy minerals may consist largely of magnetic, limonite and hematite associated with other minerals such as garnet, rutile, zircon, chromite, amphiboles, and pyroxenes. In Western gold placers, the black sand content is commonly between 5 and 20 pounds per cubic yard of bank-run gravel.

BLUE GRAVEL or BLUE LEAD. Some of the deeper, water-saturated gravels found in California's Tertiary channels have a distinctive bluish-gray color and for this reason early miners referred to them as "blue gravel". At one time they were believed to represent a separate gravel flow, distinct from the overlaying red gravels. Actually, these blue gravels represent unoxidized portions of the gravel channels whereas the red gravels represent the oxidized portions of the same material.

BOOMING. A variation of ground sluicing in which water is stored in a reservoir and suddenly released to provide a rush of water, in a large volume, which erodes and transports the gravel. Booming is generally employed where water is scarce. In California the contrivances for collecting and discharging water are termed SELF-SHOOTERS. See - Ground sluicing.

BRAIDED STREAMS. 1. A braided stream is one flowing in several divided and reuniting channels resembling the strands of a braid, the cause of division being the obstruction by sediment deposited by the stream. 2. Where more sediment is being brought into any part of a stream than it can remove, the building of bars becomes excessive, and the stream develops an intricate network of interlacing channels, and is said to be braided. 3. Conditions which cause braiding are common in glacial areas where much sediment is added by the melting ice and in semiarid regions where the transporting power of streams is reduced by seepage and evaporation. In general, such conditions are not conducive to the formation of placers.

BREAKOUT. A point where a ravine or canyon cuts into, but not through, a channel. Usually applied to buried Tertiary channels.

BREAST. The working face of a prospect drift on the pay lead; the face of a gangway being mined.

BUCKET-LINE DREDGE or **BUCKET-ELEVATOR DREDGE.** A dredge in which the material excavated is lifted by an endless chain of buckets. Also known as Connected-bucket dredge. The type of bucket-line dredge generally employed in placer mining is a self-contained digging, washing and disposal unit, operating in a pond and capable of digging, in some cases, more than 100 feet below water. Its machinery is mounted on a shallow-draft hull and the dredge backfills its working pit (pond) as it advances. The capacity of individual buckets is used as a measure of dredge size. For example, an "18-foot" dredge is equipped with buckets having a struck capacity of 18 cubic feet each. Compare with Dragline dredge; also Suction dredge.

BULLION. Unrefined gold that has been melted and cast into a bar. In placer mining, the gold sponge obtained by retorting amalgam, is commonly melted with borax or other fluxes, then poured into a bullion bar. See - Sponge.

BURIED PLACER. Old placer deposits which have become buried beneath lava flows or other strata. See - Tertiary Channel.

BY-WASH. In many cases, hydraulic giants are capable of cutting more material from the bank, than can be swept into the sluices by means of the giants alone. In such cases supplemental water may be brought into the pit by means of a ditch, to assist carrying the material to the sluices. This is locally called BY-WASH, BY-WATER or BANK WATER.

CAISSON. A metal cylinder used to sink prospect shafts in loose ground or in the presence of a large quantity of water. Caissons are usually provided in sets of 4 or more telescoping units.

CALICHE. A brown or white material commonly found as a subsoil deposit in arid or semi-arid climates, and which is composed largely of calcium carbonate. It is commonly encountered in desert placers where its cementing effect adversely affects the mining and washing processes.

CAPPING. Volcanic flow materials or agglomerates that cover and in some cases, conceal underlying auriferous gravels. Commonly found associated with Tertiary channels in California's Sierra Nevada region. Also called CAP ROCK.

CASING. Steel tubing or pipe used to case a drill hole. In placer sampling it is usually driven into the formation ahead of the drill bit and when so used, is commonly called a "drive pipe".

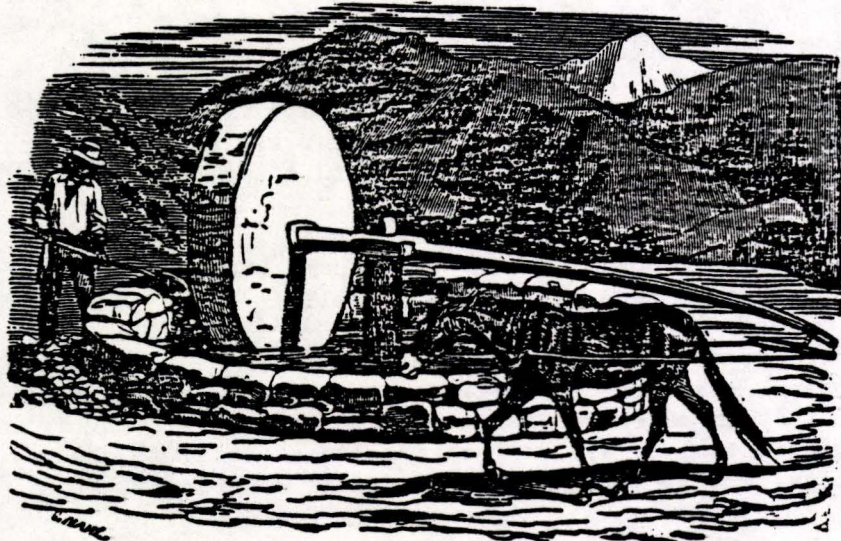
CEMENT. The Material that binds together the sand and gravel particles in an indurated placer or other formation. The cementing material can be calcareous, silicious or ferruginous. Also used when referring to the hardened formation as a whole. Cemented gravels must, in some cases, be milled to release their gold content.

CHANNEL. A stream-eroded depression in the bedrock, ordinarily filled with gravel. See - Tertiary channel.

CHURN DRILL. A portable drilling machine arranged to successively raise and drop a heavy string of tools suspended from a drill line. By means of the successive blows the formation is chopped up and the hole deepened. The type of churn drill designed for placer sampling is often referred to as a "Keystone" drill or "placer" drill.

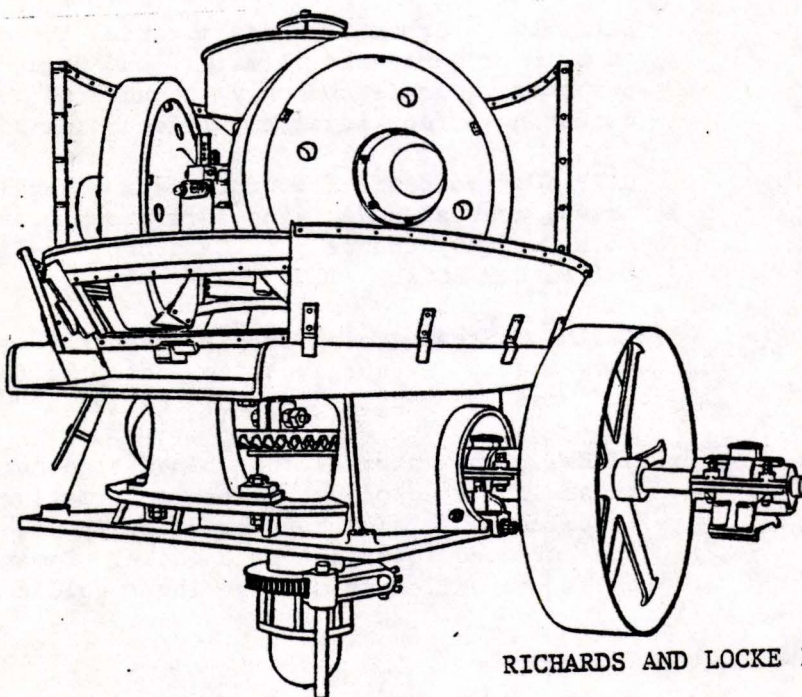
CHUTE. A flume for sliding ore.

CHILI MILL. A means of crushing ore by large rollers.



THE CHILI MILL.

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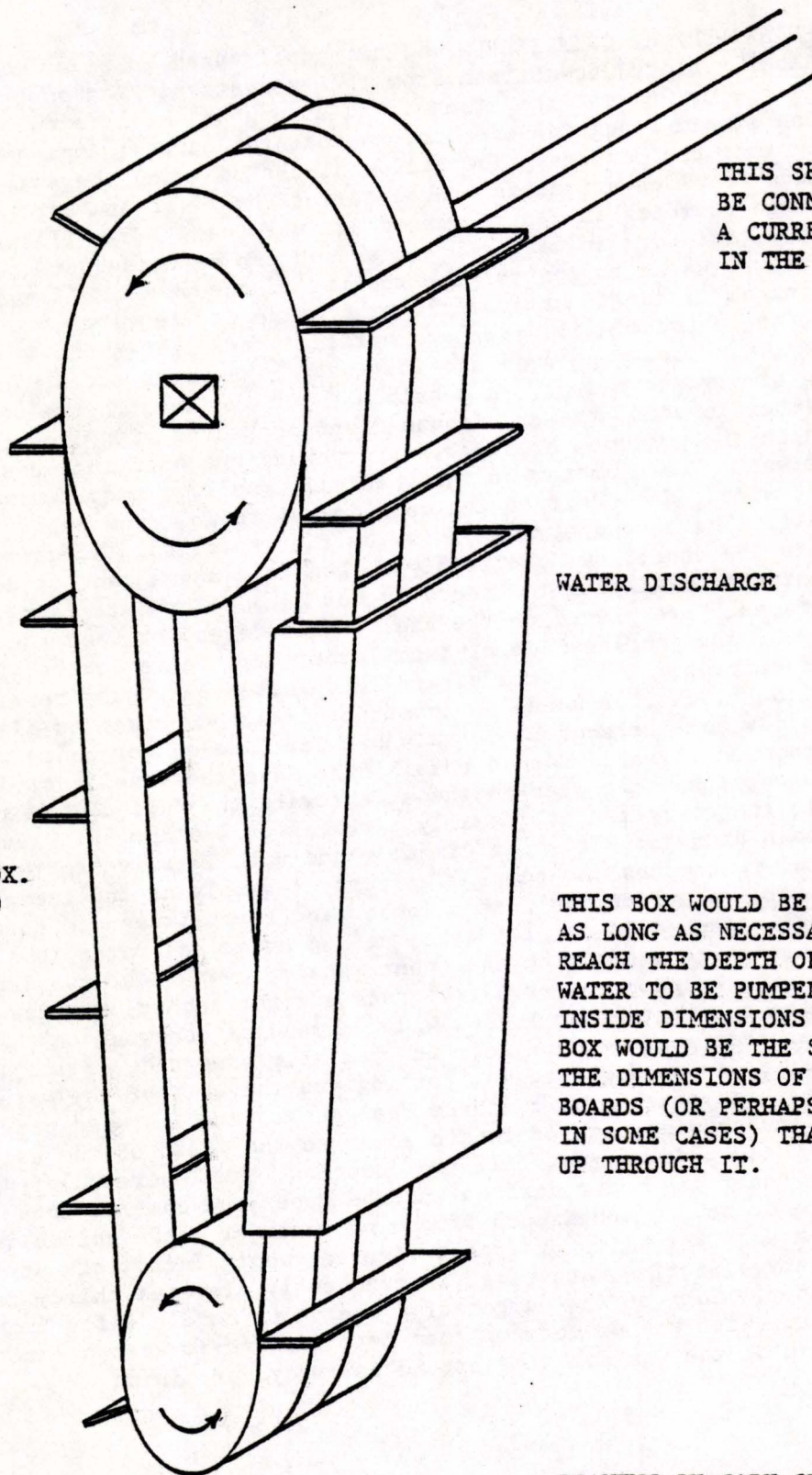
RICHARDS AND LOCKE 194

The Garfield Chili mill.

CHINA PUMP or CHINESE PUMP. The pump is used in river mining, and it is usually placed downstream from the excavation. The power for this pump is the current of the stream. An undershot wheel is built and placed in the stream alongside the dam, so that the current impinges directly against the paddles. The pillow blocks on which the shaft rests are made of piles driven in the bottom of the river and buttressed by as large boulders as can be placed against them. The pillow blocks are not fast, but work in vertical slides and can be raised or lowered by levers, so as to control the running of the wheel. If necessary another wingdam is built out from the other side of the river, to turn the force of the current still more against the wheel. This wheel being very liable to be swept away and lost when high water comes, is constructed as simply and cheaply as possible. For the shaft a twelve-inch square timber is used, the ends rounded and protected with iron rings, into which the gudgeons of the two or two and one half inch cast journals are driven. The diameter of the wheel is usually ten or twelve feet, and the width, dependent on the work it has to do, from eight to eighteen feet. The arms are made of two by four scantling, sometimes morticed into the shaft, but preferably spiked to flanges made of double inch boards from sixteen to twenty inches deep. Three to four sets of twelve arms each are placed on the shaft, this depending upon the width of the wheel, and paddles made of inch lumber and twelve inches wide dip into the current. The journals turn in seasoned oak boxes resting on the pillow blocks. A wheel so constructed can be broken to pieces quite rapidly and the shaft, the valuable part, saved for another season's work when it would not be possible to save the wheel entire. Between the wheel and the pier on the side toward the dam, is the gear connecting with the countershaft, usually a rubber or leather belt running on a wooden drum three feet in diameter and with a twelve to twenty-four inch face, which runs the pump. The pump is simply an inclined box made of one or one and one half inch lumber and from sixteen to thirty-six feet long; attached in it at the bottom and under the water is another drum not as large as that on the countershaft; over these two drums and through the pump box or barrel runs a tight rubber or canvas belt, from twelve to twenty-four inches wide, dependent somewhat on the quantity of water that must be handled, and specially prepared, if the latter material is used, to resist rotting and the grit of the water; on the outer side of this belt, three feet apart, are fastened paddles three to six inches wide, and of length equal to the width of the belt. The belt and these paddles just fill the pump box, the lower end of which being open under the water surface and the upper end opening into the discharge flume or box, a continuous stream of water of large volume is pumped or elevated. For lifts of from twelve to twenty feet, this style of pump is very effective, and water is frequently elevated thirty feet by means of them. Some of the larger of these pumps handle fifty inches of water. With one or more of them to clear and to keep clear the area inside of the wingdam, the ground is ready for mining.

"CHINA PUMP"

BOARDS ARE APPROX.
6" X 16" X 2" thick
AND ARE SPACED APPROX.
18" APART ON THE TWO
6" WIDE RUBBER AND
FABRIC BELTS



THIS SHAFT WOULD
BE CONNECTED TO
A CURRENT WHEEL
IN THE RIVER

WATER DISCHARGE

THIS BOX WOULD BE MADE
AS LONG AS NECESSARY TO
REACH THE DEPTH OF THE
WATER TO BE PUMPED. THE
INSIDE DIMENSIONS OF THE
BOX WOULD BE THE SAME AS
THE DIMENSIONS OF THE
BOARDS (OR PERHAPS BUCKETS
IN SOME CASES) THAT PASS
UP THROUGH IT.

DRAWING BY GARY STUMPF

THIS DRAWING WAS MADE FROM A SKETCH AND DESCRIPTION PROVIDED BY CHESTER BARTON OF HORSE CREEK DURING A TAPED INTERVIEW ON 4-12-77 AND 4-13-77. THE TRANSCRIPT OF THIS INTERVIEW, ON FILE WITH THE KLAMATH NATIONAL FOREST IN YREKA, SHOULD BE REFERRED TO. THIS DRAWING IS A VERY ROUGH REPRESENTATION OF THE PROCESS INVOLVED AND SHOULD NOT BE CONSIDERED COMPLETE, PROPORTIONALLY ACCURATE, OR TO SCALE.

CLAIM. See - Mining claim.

CLEAN-UP. 1. The operation of collecting the gold or other valuable material from the recovery system of a dredge, hydraulic mine or other placer operation. 2. The valuable material resulting from a clean-up. This may also be gold that has settled in a flume or been ground into the floor of a arrastra.

COARSE GOLD. The word "coarse", when applied to gold, is relative and is not uniformly applied. Some operators consider coarse gold to be that which remains on a 10-mesh screen. Others consider individual particles weighing 10 milligrams or more to be coarse gold. Some apply the term "coarse gold" to any particle that is relatively thick as compared to its diameter and can be easily picked up with the fingers.

COBBLE. A smoothly rounded stone, larger than a pebble and smaller than a boulder.

COLLAR. The mouth. The junction of a mine shaft and the surface. The term applied to the timbering or concrete around the mouth.

COLLUVIAL. Consisting of alluvium in part and also containing angular fragments of the original rocks.

COLOR. A particle of metallic gold found in the prospector's pan after a sample of earth has been washed. Prospectors say, "The dirt gave me so many colors to the pan".

CONCENTRATE. (verb) To separate a metal or mineral from its ore or from less valuable material. (noun) The product of concentration.

CONCENTRATION. The removal by mechanical means of the lighter and less valuable portions of ore.

CONFLUENCE. A junction or flowing together of streams; the place where streams meet.

CONGLOMERATE. Rounded waterworn fragments of rock of pebbles, cemented together by another mineral substance.

CONTACT. The surface along which two different rock formations come together. This is an item of importance where the contact is between igneous and sedimentary rocks because ore bodies often occur along or near such contacts.

COUNTRY ROCK. Rock outside of the vein or mineralized zone.

CRADLE. This device is similar to the rocker. It is designed so that the coarse stones and gravel stay in its hopper and water washes the sand and gold into the riffle-bars in the apron or bottom of the cradle.

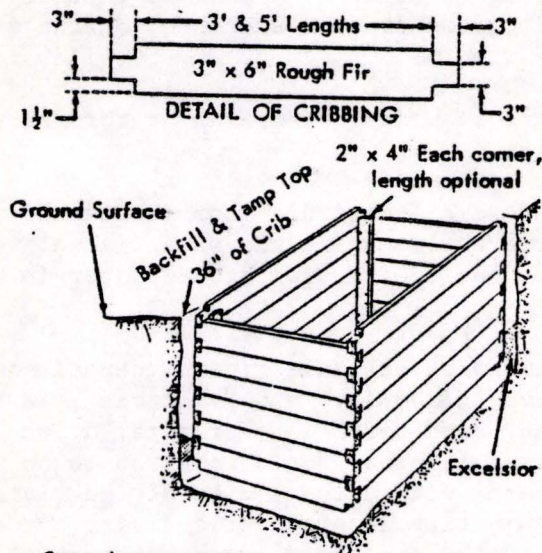


THE CRADLE AND MANNER OF USING IT.

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CREVICING. A small-scale mining method in which the miner removes detrital material from cracks and crevices in the bedrock, usually by means of pry bars and long-handled spoons, and washes the material to recover its gold content.

CRIBBING. Close timbering, as the lining of a shaft. In placer work, cribbing may be needed to support the walls of shaft or test pit put down in loose or wet ground.



Space between cribbing and test pit walls to be backfilled with excelsior when exploring loose ground.

WELLS 1962

Test pit cribbing suitable for use in shallow placer ground. (From U.S. Bureau of Reclamation Concrete Manual, 7th edition, 1963).

CROSSCUT. An adit which crosses the vein at right angles to it. This term is also generally defined as "an underground passage directed across an ore body to test its width and value or from a shaft to reach the ore body." A crosscut thus does not have to be an adit. It may connect two adits, or simply branch off the main adit to cross the ore.

DEBRIS. The tailings from hydraulic mines.

DETRITUS. A general name for incoherent sediments, produced by the wear and tear of rocks through the various geological agencies. The name is from the Latin for "worn" rock waste. A deposit of such material.

DIP. The inclination of a vein from the horizontal.

DIP BOX. A modification of the sluice box used for small-scale mining where water is scarce. It generally consists of a short sluice made of 1 x 12-inch lumber, and standing on legs arranged to provide a steep slope. The gold-bearing material is washed in batches by first shoveling it into the upper end of the dip box and then pouring water over it, usually from a dipper. See - Cradle.

DIRT. A miner's term for auriferous gravel or for the material being worked. See - Pay dirt.

DISCHARGE HEAD. The vertical distance from the center of a pump to the center of the discharge outlet where the water is delivered, to which must be added the loss due to friction of the water in the discharge pipe.

DISCOVERY. The finding of a valuable mineral deposit in place upon a mining claim. Although "discovery" and "valuable", as they relate to mining claims, have not been defined by statute, a long history of court decisions have held that in order for a location to be valid, there must be a discovery of mineral within the limits of the claim and the discovery must be such as would justify a person or ordinary prudence in the further expenditure of time and money, with reasonable prospect of success in developing a profitable mine. In some decisions the word "valuable" is interchanged with "profitable".

DISCOVERY CLAIM. (Alaska) A claim covering the initial discovery on a creek. Subsequent claims are commonly designated as one above, two above, three above; one below, two below, etc., depending on their position in relation to the discovery claim.

DIVINING ROD. Stick of witch hazel used in prospecting for lodes.

DOODLEBUG. A miners' term for a dragline dredge, a divining rod supposedly useful for locating gold or other valuable minerals. See - Dragline dredge.

DRAGLINE. A power shovel equipped with a long boom and a heavy digging bucket that is suspended from a hoisting line and is pulled toward the machine by means of a "drag" line. By manipulating the two lines (wire ropes), the bucket can be caused to dig, carry, or dump the excavated material. Such a machine is more properly called a dragline excavator. See - Dragline dredge.

DRAGLINE DREDGE. A dragline dredge consists of two units; a self-propelled power shovel equipped with a dragline bucket, and a floating washing plant which is similar to, but usually smaller than that of a bucket-line dredge. The washing unit contains a hopper for receiving gravel dug by the dragline; a revolving screen; riffled sluices or other gold-saving equipment, and a tailings stacker. Dragline dredges are generally employed to mine relatively small, shallow deposits.

DREDGE. A machine, operated by power, and usually mounted on a flat-bottomed hull provided with the equipment necessary to dig, process, and dispose of alluvial or other unconsolidated materials of a type found at the bottom of streams and rivers or in certain terrestrial and offshore deposits. See - Bucket-line dredge; Jet dredge; Suction dredge.

DREDGE SUCTION. The depth of gravel, or a particular vertical section within a placer deposit, that will pay to mine by dredging.

DRIFT. (geol.) Any rock material, such as boulders, till, gravel, sand, or clay, transported by a glacier and deposited by or from the ice or by or in water derived from the melting of the ice.

DRIFT. (mining) 1. A sub-tunnel running from the main tunnel to prospect for the pay lead; 2. A sub-tunnel run from the main tunnel across the pay lead to block out the ground and to facilitate its working; 3. Generally, a sub-tunnel.

DRIFT MINING. A method of mining gold-bearing gravel by means of drifts, shafts or other underground openings, as distinguished from surface methods for placer mining.

DRILL. See - Churn drill.

DRILL CORE. A cylindrical core of sand and gravel forced upward into the drill casing as the casing or "drive pipe" is forced into the deposit, usually ahead of the drill bit.

DRILL FACTOR. A figure used to designate the effective area of a drive shoe used in placer sampling. For example: A new, 7½-inch drive shoe has an open area of 0.306 sq. ft. but to allow for wear and other variables, some engineers use a lesser figure (commonly 0.27) in their value calculations. The figure so used is referred to as the **DRILL FACTOR**.

DRILL LOG. The record of a drill hole, usually recorded on a prepared form as the work progresses. The usual placer log, in addition to showing the drilling progress, type of material penetrated, its mineral content, etc., will also show the type and size of equipment used, personnel employed, cause of delays, and other details of the work. A complete log will also show the essential calculations and all factors used in arriving at the reported value.

DRIVE PIPE. See - Casing.

DRIVE SHOE. A hardened steel protective shoe attached to the lower end of a drive pipe or casing. The drive shoe is usually slightly larger in diameter than the casing and is provided with a beveled cutting edge. See - Casing.

DRY DIGGINGS. In the 1850's, placers in or along the banks of California's rivers were known as "Wet diggings", and those in the dry ravines adjacent to the rivers were referred to as "Dry diggings". Compare with DRY PLACER.

DRY PLACERS. Placers in arid or semi-arid regions, or generally where surface water is not available.

DRY WASHER. A device for recovering gold or other heavy minerals from dry alluvial material without the use of water. The typical dry washer is a small, hand-powered machine employing a sloping riffle board and a bellows or blower arrangement. The bottom of the riffle board is made of some porous material such as heavy cloth. Puffs of air forced up through the bottom by the bellows or blower, cause the lighter materials to hop over the riffles and work their way through the machine, while the gold or other heavy materials lodge behind the riffle bars.

DRY WASHING. The extraction of gold or other minerals from dry sand and gravel by the use of machines in which air is employed as a separating medium.

DRYLAND DREDGE. A mechanical washing plant, sometimes of appreciable size, designed to follow a dragline, or other excavator, as the mining cut advances. Some are equipped with trommel-type revolving screens and rock stackers, and are mounted on crawler-type tracks.

DUMP. 1. The fall immediately below a hydraulic mine outlet and in particular, the area available for tailings storage. 2. A specially prepared place outside of a drift mine, usually near the portal, where the pay gravel is deposited preparatory to washing. 3. A pile or heap of material, usually waste material, extracted from a mine.

ELUVIUM. Loose material resulting from decomposition of rock. Eluvial material may have slumped or washed downhill for a short distance but it has not been transported by a stream.

EXPANDED METAL. (Expanded-metal lath) A type of punched-metal screen. The style commonly used in placer mining, for saving fine gold, consists of a latticework of diamond-shaped openings (about $3/4"$ x $1\frac{1}{2}"$) separated by raised metal strands that have a decided slope in one direction. When installed as riffles, with this slope leaning downstream, eddies form beneath the overhangs, thus creating conditions well-suited for the saving of fine gold. When used as riffles, expanded metal is generally placed over cocoa matting or similar material. A flat-lying style of expanded metal (without overhangs) is less-suited for this use.

FALSE BEDROCK. A hard or relatively tight formation within a placer deposit, at some distance above true bedrock, upon which gold concentrations are found. Clay, volcanic ash, caliche or "tight" gravel formations can serve as false bedrocks. A deposit may have gold concentrations on one or more false bedrocks, with or without a concentration on true bedrock.

FINE GOLD. 1. Pure gold, i.e., gold of 1000-fineness. 2. Gold occurring in small particles such as those which would pass a 20-mesh screen but remain on 40-mesh.

FINENESS. The proportion of pure gold in bullion or in a natural alloy, expressed in parts per thousand. Natural gold is not found in pure form; it contains varying proportions of silver, copper and other substances. For example, a piece of natural gold containing 150 parts of silver and 50 parts of copper per thousand, and the remainder pure gold, would be 800-fine. The average fineness of placer gold obtained in California is 885.

FINES. 1. The sand or other small-size components of a placer deposit. 2. The material passing through a screen during washing or other processing steps of a placer operation.

FIRE ASSAY. The assaying of metallic ores, usually gold or silver, by methods requiring furnace heat. Fire assaying, in essence, is a miniature smelting process which recovers and reports the total gold content of the assay sample, including gold combined with other elements, or mechanically locked in the ore particles. Consequently, the gold value indicated by fire assay is not necessarily recoverable by placer methods. For this and other reasons, the gold content of placer material is not normally determined by fire assay.

FLAKY GOLD. Very thin scales or gold pieces.

FLASK. The unit of measurement for buying and selling mercury (quick-silver). A standard iron flask contains 76 pounds of mercury.

FLAT. An essentially level gravel bar or deposit along the banks of a river.

FLOAT. A term much used among miners and geologists for pieces of ore or rock which have fallen from veins or strata, or have been separated from the parent vein or strata by weathering agencies. This term is not usually applied to stream gravels.

FLOAT-GOLD. Flour gold. Particles of gold so small and thin that they float on and are liable to be carried off by the water. See - Flood gold.

FLOOD GOLD. Fine-size gold flakes carried or redistributed by flood waters and deposited on gravel bars as the flood waters recede. Flood gold sometimes forms superficial concentrations near the upstream end of accretion bars. See - Float gold.

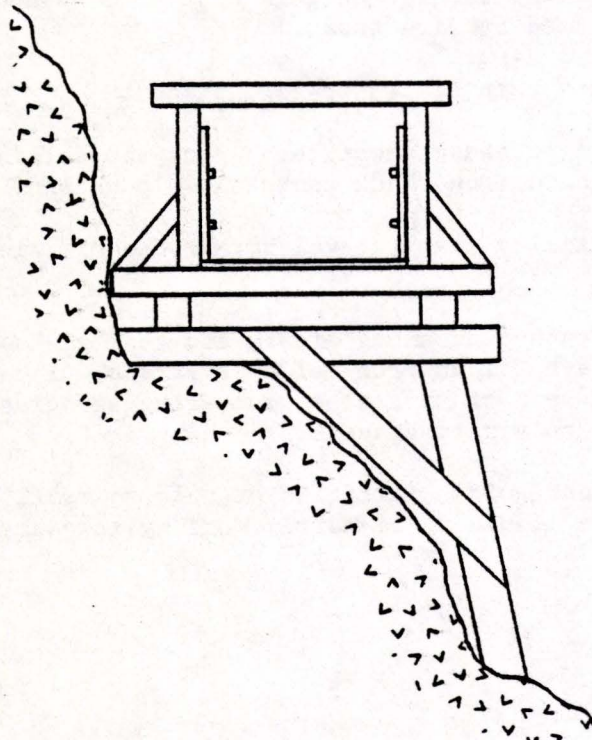
FLOOD PLAIN. That portion of a river valley, adjacent to the river channel, which is built of sediments during the present regimen of the stream and which is covered with water when the river overflows its banks at flood stages.

FLOTATION. The minimum working draft of a dredge. When a dredge "digs flotation" it excavates the ground to the minimum depth required for floating the dredge. This is usually done when passing through tailings or moving between nearby working areas.

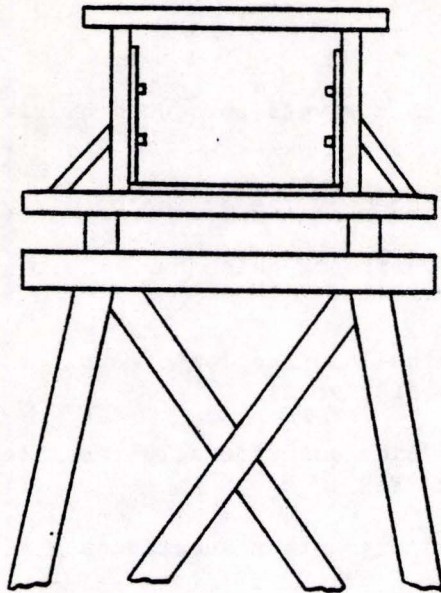
FLOUR GOLD. The finest gold dust, much of which will float on water. Flour gold, such as that found along the Snake River in Idaho, commonly runs 3 million colors to the ounce.

FLOURED MERCURY (QUICKSILVER). The finely granulated condition of quicksilver, produced to a greater or less extent by its agitation during the amalgamation process. The coating of quicksilver with what appears to be a thin film of some sulphide, so that when it is separated into globules these refuse to reunite. Also called Sickening and Flouring.

FLUME. An artificial channel, usually made of wood, for conducting water. Flumes are used in mining when ditches cannot be made. They often cross rocky sideslopes and canyons.

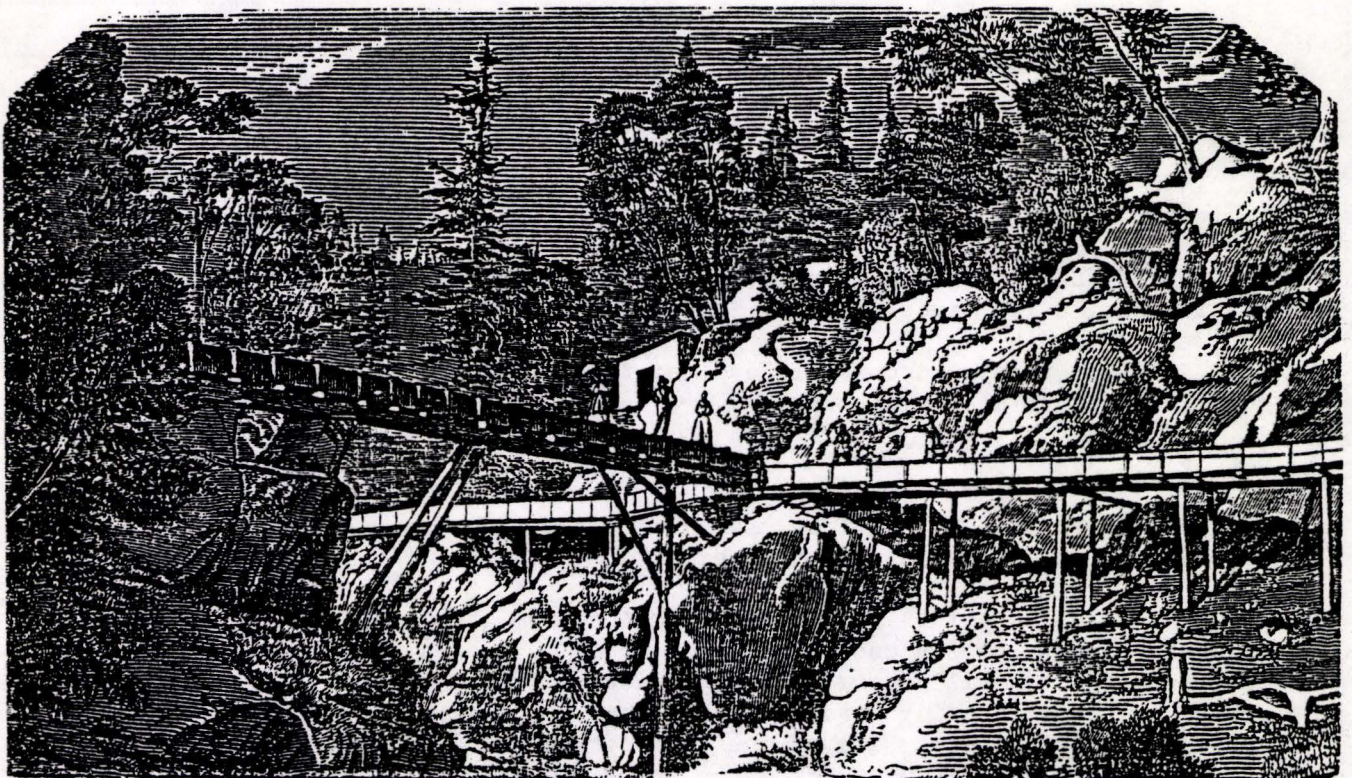


Method of constructing a flume along the side of a steep slope.



Trestled flume construction.

STUMPF 1979



FLUMING IN A CANYON.

OLMSTED 1962

FLUVIAL. Of, or pertaining to rivers; produced by river action, as a fluvial plain.

FLUVIATILE. Caused or produced by the action of a river; fluvial.

FLUVIOGLACIAL. Produced by streams which have their source in glacial ice. See - Glaciofluvial.

FLUVIO-MARINE. Formed by the joint action of a river and the sea, as in the deposits at the mouths of rivers.

FOOL'S GOLD. A substance which superficially resembles gold; usually pyrite, a sulphide of iron, FeS_2 .

FREE GOLD. Gold uncombined with other substances - placer gold.

FREE GOLD ASSAY. A procedure carried out to determine the free gold content of an ore. In the case of placer material; a procedure to determine the amount of gold recoverable by gravity concentration and amalgamation.

FREE-WASH GRAVEL. Gravel that readily disintegrates and washes in a sluice. Loose, clay-free gravels such as those found in accretion bars are generally free-wash gravels.

GAD. A small pointed wedge.

GIANT. See - Hydraulic giant or Hydraulic monitor; Intelligiant.

GLACIAL. Pertaining to, characteristic of, produced or deposited by, or derived from a glacier.

GLACIOFLUVIAL. Of, pertaining to, produced by, or resulting from combined glacier action and river action. See - Fluvioiglacial.

GOLD DUST. A term once commonly applied to placer gold, particularly gold in the form of small colors.

GOLD PAN. See - pan.

GOLD-SAVING TABLE. The sluices used aboard a dredge are customarily called gold-saving tables, rather than sluice boxes.

GRADE. 1. The amount of fall or inclination from the horizontal in ditches, flumes, or sluices; usually measured in inches fall per foot of length or inches fall per section of sluice. 2. The slope of a land or bedrock surface; usually measured in percent. A one percent grade is equivalent to a rise or fall of one foot per hundred. 3. The slope of a stream, or the surface over which the water flows; usually measured in feet per mile. Streams having a grade of about 30 feet per mile favor the accumulation of placers, particularly where a fair balance between transportation and deposition is maintained for a long time. 4. The relative value or tenor of an ore, or of a mineral product.

GRADED STREAM. A stream in equilibrium, that is, a stream or a section of a stream that is essentially neither cutting or filling its channel.

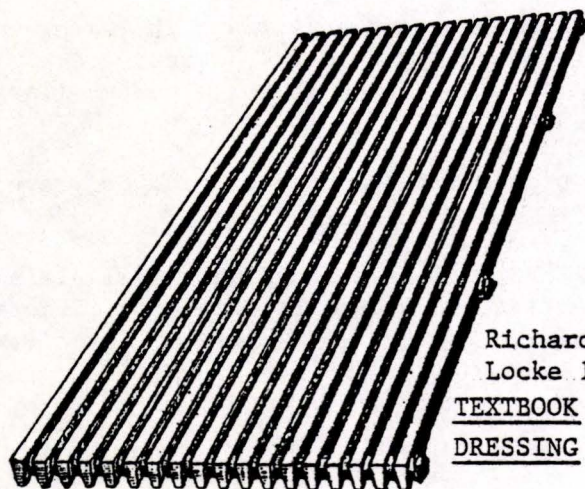
GRAIN. A unit of weight equal to 0.0648 part of a gram, 0.04167 part of a pennyweight, or 0.002083 part of a troy ounce. There are 480 grains in a troy ounce. A grain of fine gold has a value of \$1.12 (@\$35/oz.).

GRAVEL. A comprehensive term applied to the water-worn mass of detrital material making up a placer deposit. Placer gravels are sometimes arbitrarily described as "fine" gravel, "heavy" (large) gravel, "boulder" gravel, etc.

GRAVEL MINE. A placer mine; a body of sand or gravel containing particles of gold.

GRAVEL PLAIN PLACERS. Placers found in gravel plains formed where a river canyon flattens and widens or more often, where it enters a wide, low-gradient valley.

GRIZZLY. An iron grating which serves as a heavy-duty screen to prevent large rocks or boulders from entering a sluice or other recovery equipment.



Grizzly or bar screen.

Richards and
Locke 1940
TEXTBOOK OF ORE
DRESSING

GROUND SLUICING. A mining method in which the gravel is excavated by water not under pressure. A natural or artificial water channel is used to start the operation and while a stream of water is directed through the channel or cut, the adjacent gravel banks are brought down by picking at the base of the bank and by directing the water flow as to undercut the bank and aid in its caving. Sluice boxes may or may not be used. Where not used, the gold is allowed to accumulate on the bedrock awaiting subsequent clean-up. A substantial water flow and adequate bedrock grade are necessary. See -Booming.

GRUB STAKE. Provisioning a prospector on a bargain to share his discoveries or on credit.

GUTTER. The lowest portion of an alluvial deposit; commonly a relatively narrow depression or trough in the bedrock. In some placers the pay streak is largely confined to a narrow streak or "gutter".

HEAD. 1. A measure of (water pressure. 2. The height of a column of water used for hydraulicking. For example, a hydraulic mine in which the point of water discharge is 200 vertical feet below the intake point (of the pipe) would be said to be working with a 200-foot head.

HEAVY GOLD. 1. Gold in compact pieces that appear to weigh heavy in proportion to their size. 2. Rounded, "shotty" or "nuggety" gold.

HEAVY MINERALS. The accessory detrital minerals of a sedimentary rock, of high specific gravity. The black sand concentrate common to placers, would more properly be called a "heavy-mineral" concentrate.

HIGH-GRADE. 1. Rich ore. 2. To steal or pilfer ore or gold, as from a mine by a miner.

HIGH-GRADER. One who steals and sells, or otherwise disposes of high-grade or specimen ores.

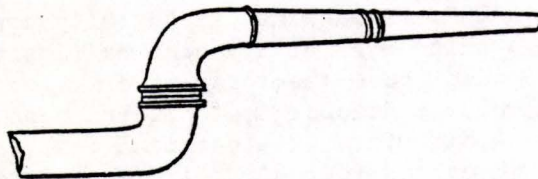
HIGH TENSION SEPARATOR. A machine, essentially consisting of a rotating drum, upon which a thin layer of dry sand or mineral grains are fed, and an electrode suspended above the rotating drum, or rotor. The electrode furnishes a high voltage discharge at high current flow. High tension separators employ a high rate of electrical discharge to separate various minerals according to their relative conductivity. Some are pinned to the rotor while others are attracted toward the electrode, with a resultant "lifting" effect. The pinning and lifting effects, imparted in varying degrees to different minerals, flattens or heightens their respective trajectories as they leave the rotor. Adjustable splitters placed in the trajectory are employed to cut selected minerals or groups of minerals from the thus stratified stream of material. High tension separators differ from electrostatic separators in that the latter employ charged fields with little or no current flow. High tension separators are extensively used for separating heavy minerals recovered from beach sands, monazite placers, etc.

HILLSIDE PLACERS. A group of gravel deposits intermediate between the creek and bench placers. Their bedrock is slightly above the creek bed, and the surface topography shows no indication of benching.

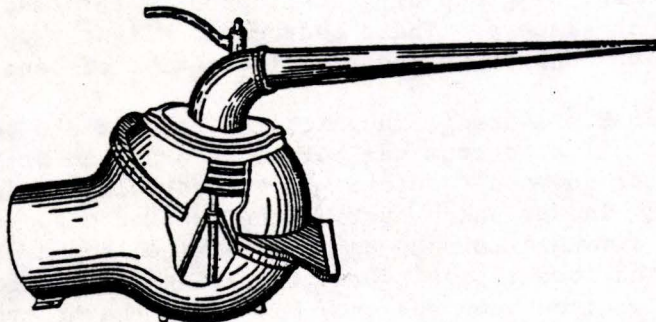
HYDRAULIC DREDGE. A dredge in which the material to be processed is excavated and elevated from the bottom of a stream or pond by means of a pump or a water-powered ejector. Large hydraulic dredges may be equipped with a digging ladder which carries the suction pipe and a motor-driven cutter head, arranged to chop-up or otherwise loosen material directly in front of the intake pipe. Dredges having this configuration employ a deck-mounted suction pump and they may carry the mineral recovery equipment on board the dredge or more commonly, they may transport the excavated material, by means of a pipe line, to a recovery plant mounted on independent barges or on the shore. See - Jet dredge; also bucket-line dredge.

HYDRAULIC ELEVATOR. A near-vertical pipe employed in hydraulic mining to raise excavated material from the working place to an elevated sluice, or to a disposal area, by means of a high-pressure water jet inducing a strong upward current in the elevator pipe. See - Rubel elevator.

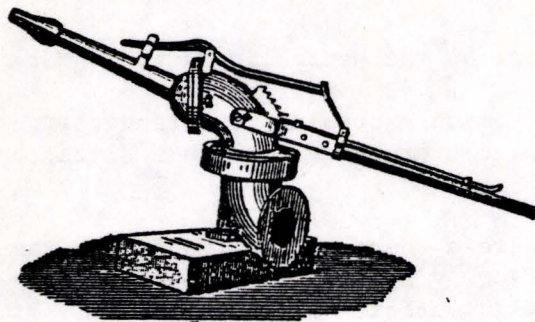
HYDRAULIC GIANT or HYDRAULIC MONITOR. The nozzle assembly used in hydraulic mining. The giant is provided with a swivel enabling it to be swung in a horizontal plane, and it may be elevated or depressed in a vertical plane. Nozzle sizes range from 1 to 10 inches in diameter and the larger sizes are provided with a deflector, enabling them to be moved with little effort. In California, giants discharging as much as 15,000 gallons per minute in a single stream at a nozzle pressure of over 200 pounds per square inch, have been used. The giant is also known as a "Monitor". Both terms stem from manufacturer's trade names. See - Intelligiant.



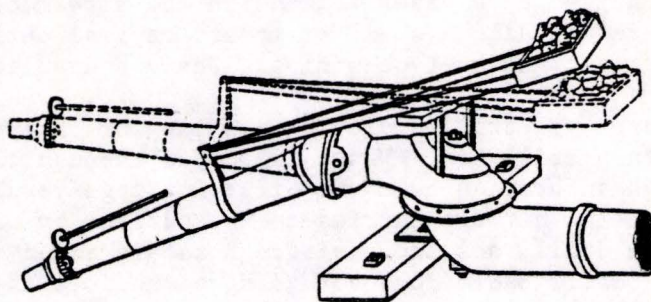
Goose neck.



Craig Globe Monitor.



Hydraulic Chief.



Hydraulic Giant.

STUMPF 1979

HYDRAULIC MINING. A method of mining in which a bank of gold bearing earth or gravel is washed away by a powerful jet of water and carried into sluices, where the gold separates from the earth by its specific gravity.

HYDRAULICKING. Mining by the hydraulic method. Note spelling.

INCHES OF WATER. A common expression denoting the quantity of water (in miners' inches) available or being used in a placer operation. See - Miners' inch.

INLET. The point where a channel is cut off by a ravine or canyon on the upstream end. Usually applied to buried Tertiary channels. Compare with Breakout; and with Outlet.

INTELLIGIANT. The trade name for a hydraulic giant that is provided with water-powered piston and cylinder arrangements to control its vertical and horizontal traverses. Some models can be rigged for automatic operation and can run unattended in a preset arc or pattern. See - Hydraulic giant.

JET DREDGE. A type of hydraulic dredge. Jet dredging equipment may range from a simple, self-contained pipe-like venturi containing riffles, that is carried by a diver and operates entirely underwater to larger and more elaborate surface units carried on inflated rubber tubes or styrofoam floats. These devices, operated by one or two men, are similar in two ways: 1. They rely on a water jet and venturi effect to pick up unconsolidated stream-bottom materials and carry them to a gold recovery device, usually riffles. 2. The suction intake is normally hand-held and is guided by a diver working on the stream bottom. The typical jet "dredge" entails a small or modest capital outlay and is typically used for recreation-type mining. See - Hydraulic dredge.

JET DRILL. A churn-type drill employing a string of reciprocal hollow rods equipped with a drill bit. Water is pumped through the rods and discharged through an orifice near the bit. Cuttings resulting from the chopping action of the bit are carried to the surface by wash water rising between the drill rods and casing. Rods are added as the hole deepens, thus the drill cable does not go down the hole as would be the case in conventional churn drilling. Jet drills are well suited to sampling low-value minerals, such as ilmenite, occurring in beach deposits.

JIG. A machine in which heavy minerals are separated from sand or gangue minerals on a screen in water, by imparting a reciprocating motion to the screen or by the pulsation of water through the screen. Where the heavy mineral is larger than the screen openings, a concentrate bed will form on top of the screen. Where the heavy mineral particles are smaller than the screen openings, a fine-size concentrate will be collected in a hutch beneath the screen.

LAGGING. Poles or small timbers used for spanning from one stull piece to another for lining behind the timbers of a shaft or tunnel.

LAKE-BED PLACERS. Placers accumulated in the beds of present or ancient lakes that were generally formed by landslides or glacial damming. It should be noted that a lake-bed (or lake-bottom) placer might actually be a drowned stream placer.

LAVA. The term "Lava" as used by a placer miner, may designate any solidified volcanic rock including volcanic agglomerates.

LEAD. (pronounced leed) Deeply buried placer gravel, where rich enough to work, and particularly when in a well-defined bed, is often termed the "lead" or, "pay lead".

LEVEL. Mines are customarily worked from shafts through horizontal passages (adits) or drifts called levels. These are commonly spaced at regular intervals in depth and are either numbered from the surface in regular order or designated by their actual elevation below the top of the shaft. See - adit illustration.

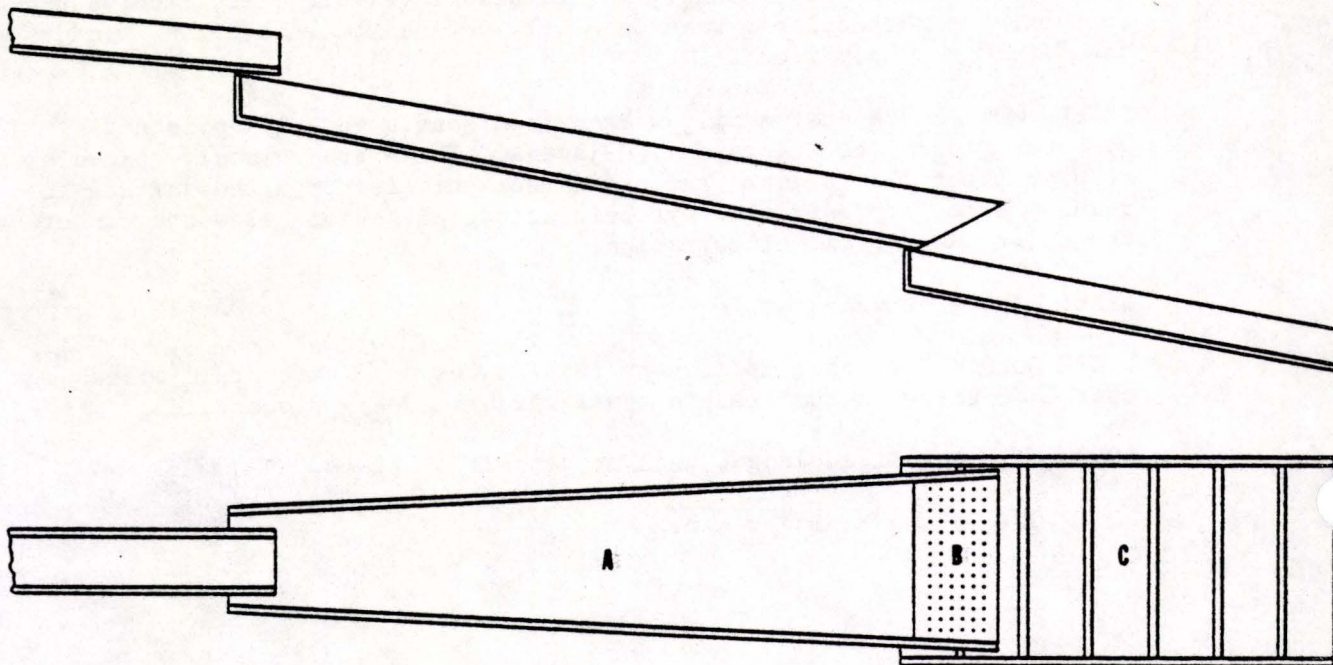
LIFE. Space between two levels.

LIGHT GOLD. Gold that is in very thin scales or flakes or in pieces that look large as compared to their weight. See - Flood gold.

LODE. A mineralized ledge, vein or deposit in place.

LOCATION. See - Mining claim.

LONG TOM. 1. A small, sluice-type gold washer widely used in California during the 1850's and 60's. The early long tom was built in two sections; a washing box equipped with a perforated plate to screen out the rocks; followed by a short sluice containing riffles. 2. A short auxiliary sluice used aboard a dredge to further reduce concentrate taken from the dredge riffles at clean-up time. 3. A short sluice used to wash placer samples.



STUMPF 1979

Long tom (side and top views) showing wooden trough (A), pierced iron plate (B), and riffle box (C).

LOW-GRADE. A term applied to ores lacking in quantity or quality of the metal for which they are mined; lean ore.

MAGNETIC SEPARATOR. A device in which a strong magnetic field is employed to remove magnetic materials from a sand or a concentrate, or to selectively remove or separate their constituent minerals. Magnetic separators are commonly used in conjunction with high tension separators to process the heavy mineral concentrates obtained from beach sands, monazite placers, tin placers, etc.

MARINE MINING. The exploitation of sea-bottom mineral deposits, including placers. See - Marine placer.

MARINE PLACER. A deposit of placer type minerals on the ocean or sea bottom beyond the low-tide line, as distinguished from beach placers. Some marine placers may contain material related to beach deposits formed during periods of low sea level. Others may contain stream-type placers or mineral concentrations formed on land and later drowned by a lowering of the coastal region.

MEANDER. One of a series of somewhat regular and looplike bends in the course of a stream, developed when the stream is flowing at grade, through lateral shifting of its course toward the convex sides of the original curves.

MEDIUM-SIZE GOLD. Gold of an approximate size that will pass through a 10-mesh screen and remain on a 20-mesh screen. Compare with Coarse gold; also Fine gold.

MERCURY. A heavy, silver-white liquid metallic element, useful in placer mining where its chemical affinity for gold is taken advantage of to help detain gold in a sluice box. Mercury placed in the riffles forms a gold amalgam which is removed at the time of clean-up and then retorted to recover the gold. The miners' term for mercury is "Quick-silver" or simply, "Quick". Symbol, Hg; specific gravity, 13.54.

MILLIGRAM. The one-thousandth part of a gram. As a matter of inconvenience, the milligram is widely used as the unit for reporting gold weights in placer samples. There are 31,103 milligrams in a troy ounce. With gold at \$35 per troy ounce, 1 milligram of fine gold is worth 0.112 cent and 1 milligram of ordinary placer gold is worth about 0.1 cent, or in other words, 10 milligrams to the cent.

MILL-RUN. The returns of a lot of ore; the assay of ore in quantity as distinguished from a specimen assay.

MINERS' INCH. A unit of water measurement. Originally it represented the quantity of water that will escape from an aperture one inch square through a two-inch plank, with a steady flow of water standing six inches above the top of the escape aperture. The miners' inch is now defined by statute in various states.

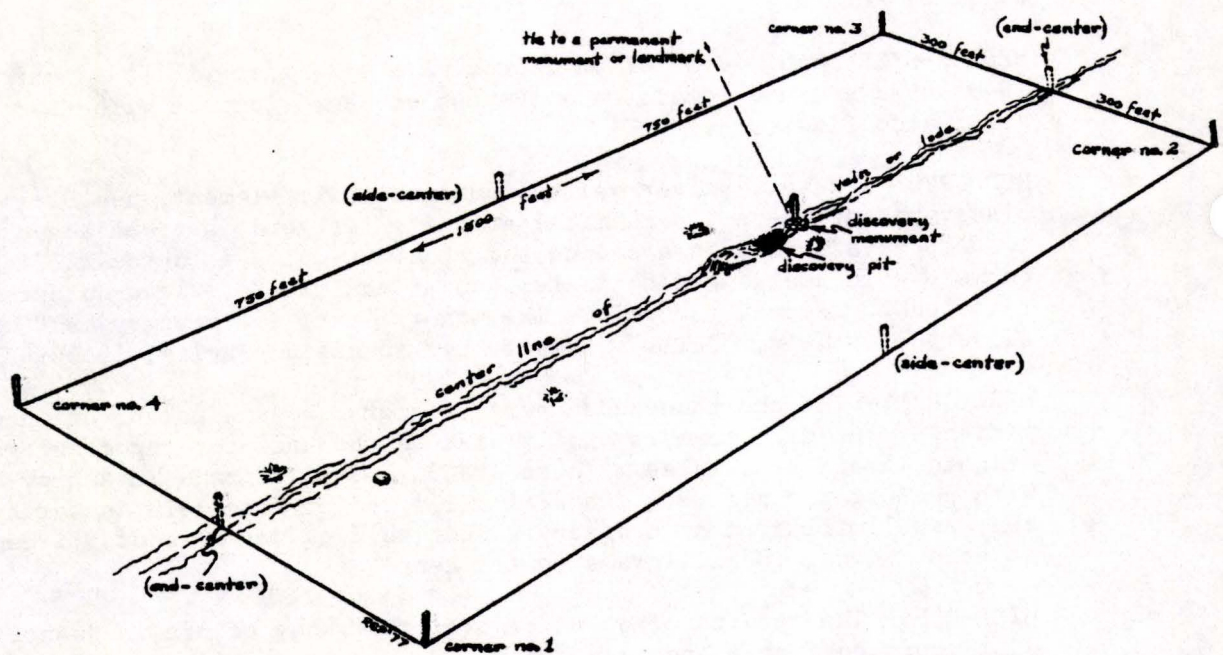
1 second foot = 40 miners' inches in Arizona, California, Montana and Oregon.
 = 50 miners' inches in Idaho, Nevada, New Mexico, and Utah.
 = 38.4 miners' inches in Colorado.

1 miners' inch equals 11.25 gallons per minute when equivalent to 1/40 second-foot.

1 miners' inch equals 9 gallons per minute when equivalent to 1/50 second-foot.

MINERS' PAN. See - Pan.

MINING CLAIM. That portion of the public mineral lands which a miner, for mining purposes, takes and holds in accordance with the mining laws. A mining claim may be validly located and held only after the discovery of a valuable mineral deposit. See - Discovery.

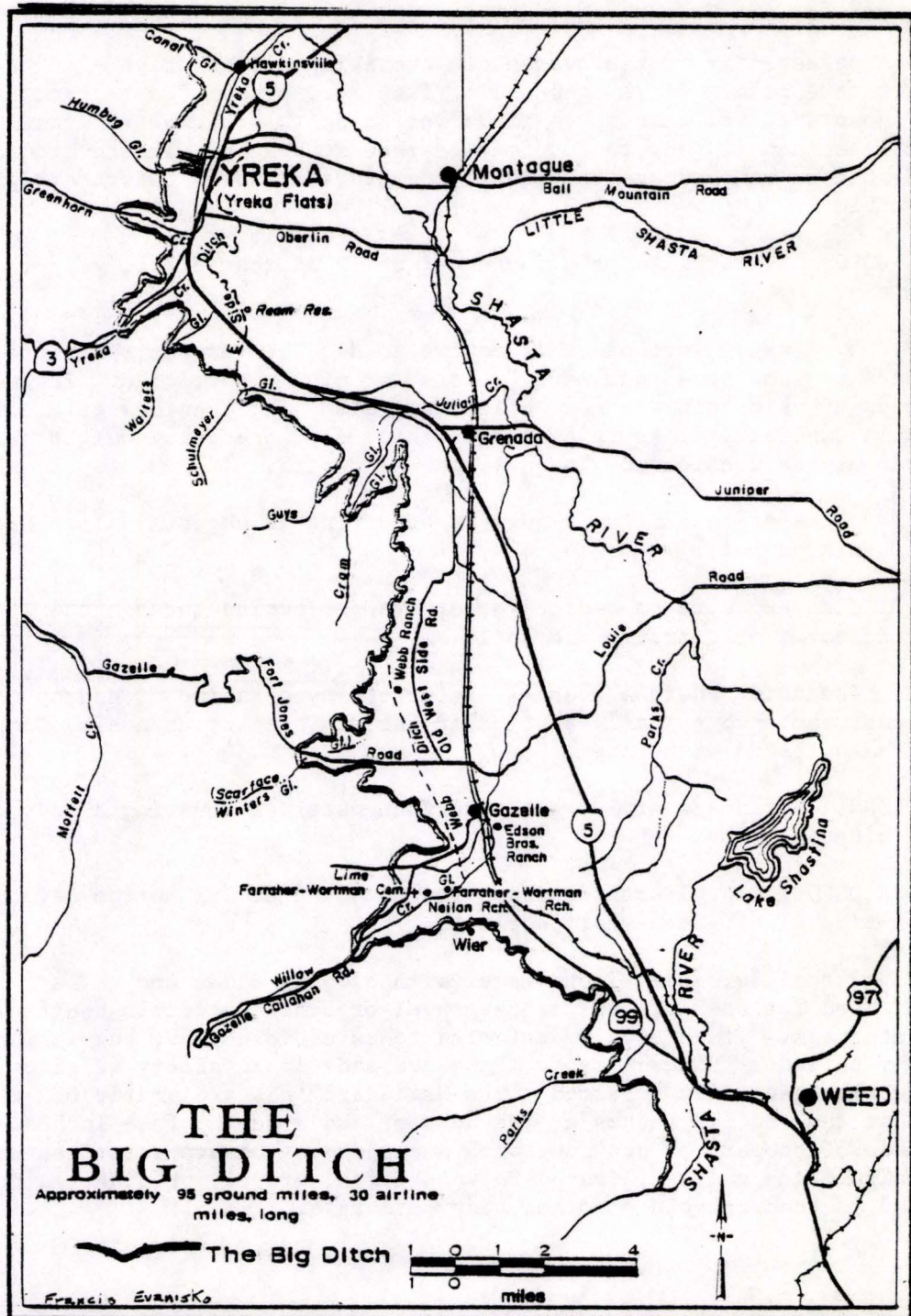


Sketch of a typical lode mining claim, showing usual claim dimensions, placement of claim monuments and

other features. Some states require additional "side-center" and "end-center" monuments at the points indicated.

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MINING DITCH. A long narrow excavation made in ground by digging. These ditches were used to bring water to claims for working the ground directly or for developing power needed in mining. They may be coupled with flumes and/or pipes. (The Yreka ditch was 95 miles long.)



MOSS MINING or MOSSING. The gathering of moss from the banks of gold-bearing streams for the purpose of burning or washing it, to recover its gold content. Under certain conditions, moss or similar vegetation will capture and hold small particles of gold being carried downstream by flood waters. See - Flood gold.

MUCK. A permanently frozen overburden overlying placer gravels in the interior of Alaska. It is composed of fine mud, organic matter and small amounts of volcanic ash. It varies in depth (thickness) from seldom less than 10 feet to 100 feet or more in places. This overburden (muck) must be removed and the underlying gravels thawed before dredging is possible.

NATIVE GOLD. 1. Metallic gold found naturally in that state. 2. Placer gold.

NUGGET. 1. A water-worn piece of native gold. The term is restricted to pieces of some size, not mere "colors" or minute particles. Fragments and lumps of vein gold are not called "nuggets", for the idea of alluvial origin is implicit. 2. Anything larger than, say, one penny-weight or one gram may be considered a nugget. See - Pepita.

NUGGETY. Like or resembling a nugget; occurring in nuggets; also abounding in nuggets.

OUTCROP. The exposure of bedrock or strata projecting through the overlying cover of detritus and soil.

OUTLET. The point where a channel is cut off by a ravine or canyon on the downstream end. Usually applied to buried Tertiary channels. Compare with Breakout; and with Inlet.

OVERBURDEN. Worthless or low-grade surface material covering a body of useful mineral.

OFFSHORE DEPOSITS. Mineral deposits on the ocean or sea bottom beyond the low-tide line. See - Marine placer.

PAN. 1. A shallow, sheet-iron vessel with sloping sides and a flat bottom, used for washing auriferous gravel or other materials containing heavy minerals. It is usually referred to as a "Gold pan", but is more properly called a "Miners' pan". Pans are made in a variety of sizes, but the size generally referred to as "standard" has a diameter of 16 inches at the top, 10 inches at the bottom, and a depth of 2½ inches. Pans made of copper, or provided with a copper bottom are sometimes used for amalgamating gold. 2. (verb) To wash earth, gravel, or other material in a pan to recover gold or other heavy minerals.

PAN FACTOR. The number of pans of gravel equivalent to a cubic yard in place. Pan factors vary according to the size and shape of the pan, the amount of heaping when filling the pan, the swell of ground when excavated, and other factors. In practice, factors for a 16-inch pan range from 150 to 200; a factor of 180 is widely used.

PANNING. Washing gravel or other material in a Miners' pan to recover gold or other heavy minerals.

PATENT. A document by which the Federal Government conveys title to a mining claim to a private individual or company.

PAY DIRT. Auriferous gravel rich enough to pay for washing or working.

PAY LEAD. (pronounced leed) Where gravel is found rich enough to work, and if there is a well-defined bed of it, it is often termed the "pay lead" or, "lead". Compare with Pay streak.

PAY STREAK. A limited horizon within a placer deposit, containing a concentration of values or made up of material rich enough to mine. Pay streaks in gold placers are commonly found as more or less well-defined areas on or near bedrock and are commonly narrow, sinuous, and discontinuous. Compare with Pay lead.

PELTON WHEEL. A high speed water wheel.

PENNYWEIGHT. A unit of weight equal to 24 grains, 0.05 troy ounce or 1.5552 grams. A pennyweight of fine gold has a value of \$1.03, with gold at \$20.67 per ounce. A pennyweight of fine gold has a value of \$1.75, with gold at \$35.00 per ounce.

PEPITA. (Spanish) A nugget; usually a smaller size.

PERMAFROST. Permanently frozen ground in Alaska, up to 100 or more feet in thickness. See - Muck.

PILOT SLUICE. A small, auxiliary sluice operated intermittently aboard a dredge to determine the amount of gold being recovered by the dredge during a given interval of time, or from a particular gravel section. The ratio of pilot sluice recovery to dredge recovery is determined for each dredge by empirical means.

PINCHED SLUICE. A film-type gravity concentrator employing a wedge-shaped trough, tapering to a narrow vertical opening at its discharge end. In use, heavy-gravity minerals migrate toward the bottom and are removed from the stratified discharge stream by means of splitters. Pinched sluice-type concentrators are used to remove heavy minerals, such as rutile and ilmenite, from beach sands. The CANNON CONCENTRATOR and PANNING CONCENTRATOR are of this type.

PIPE CLAY. Miners' term for clays or clay-like materials found in finely-laminated beds within the Tertiary gravels of California's Sierra Nevada region. Some may consist of volcanic material which has fallen into water, in the form of ash, and taken on a stratified form resembling clay in appearance.

PIPE FACTOR. The depth to which a churn drill casing must be driven to take in a sample volume of 1 cubic yard. For example, a standard 6-inch drive pipe equipped with a new, 7½-inch drive shoe would be driven 88 feet to cut out a theoretical volume of 1 cubic yard. This is sometimes called the CASING FACTOR but it is most commonly known as the DRIVE SHOE FACTOR.

PITCH. Used in connection with the bedrock in the channel or rim to express decent.

PITTING. The act of digging or sinking a pit, as for sampling alluvial deposits.

PLACER. A place where gold is obtained by washing; an alluvial or glacial deposit, as of sand or gravel, containing particles of gold or other valuable mineral. In the United States mining law, mineral deposits, not veins in place, are treated as placers, so far as locating, holding, and patenting are concerned. The term "placer" applies to ancient (Tertiary) gravels as well as to recent deposits, and to underground (drift mines) as well as to surface deposits.

PLACER DEPOSIT. A mass of gravel, sand, or similar material resulting from the crumbling and erosion of solid rocks and containing particles or nuggets of gold, platinum, tin, or other valuable minerals, that have been derived from the rocks or veins.

PLACER MINING. That form of mining in which the surficial detritus is washed for gold or other valuable minerals. When water under pressure is employed to break down the gravel, the term HYDRAULIC MINING is generally employed. There are deposits of detrital material containing gold which lie too deep to be profitably extracted by surface mining, and which must be worked by drifting beneath the overlying barren material. To the operations necessary to extract such auriferous material the term DRIFT MINING is applied.

POOR BOX. The place where carbide is kept.

PORTAL. The surface opening. "Any entrance to a mine. The retaining wall, masonry arch, etc., erected at the opening of a drift, tunnel or adit." See - adit illustration.

PROSPECTING. 1. Used to qualify work merely intended to discover a pay lead in a drift mine, or to locate the channel. 2. (generally) Searching for new deposits. 3. Drilling a known placer deposit to determine its value or delineate a minable area.

QUATERNARY GRAVELS. Gravels deposited from the end of the Tertiary, to and including the present time.

QUICKSILVER (or "Quick"). See - Mercury.

RAISE or WINZE. A subsidiary shaft which starts underground. It is usually a connection between two levels. A winze is sunk underhand and a raise is put up overhand. When the connection is completed, and one is standing at the top, the opening is referred to as a winze, and when at the bottom, as a raise. A raise or winze is usually in ore, but may be in waste rock. See - adit illustration.

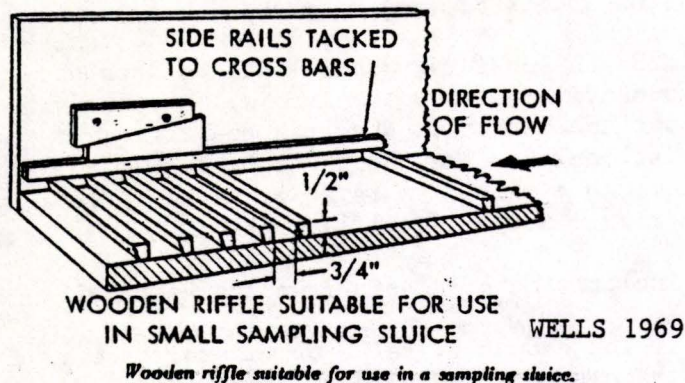
RAKE. The inclination of a vein from the vertical.

RECOVERY. 1. The amount or value of mineral recovered from a unit volume; in the case of gold placers, expressed as cents per cubic yard. 2. The amount of mineral extracted, expressed as a percentage of the total mineral content. 3. In gold dredging, the expression "R over E" (designated R/E) is used to compare actual recovery to expected recovery where R represents the actual returns and E represents the estimated recoverable value, after allowing for known or expected mining and metallurgical losses, etc. When recovery exceeds the initial estimate, the R/E will be shown as something greater than 100%, such as 105%, 110%, etc.

RESIDUAL PLACER. Essentially, an in situ enrichment of gold or other heavy mineral, caused by weathering and subsequent removal of the lode or other parent material, leaving the heavier, valuable mineral in a somewhat concentrated state. In some cases, a residual placer may be essentially an area of bedrock, containing numerous gold-bearing vein-lets that have disintegrated by weathering to produce a detrital mantle rich enough to mine. In some parts of California, such areas are known as SEAM DIGGINGS.

RETORT. A vessel with a long neck used for distilling the quicksilver from amalgam.

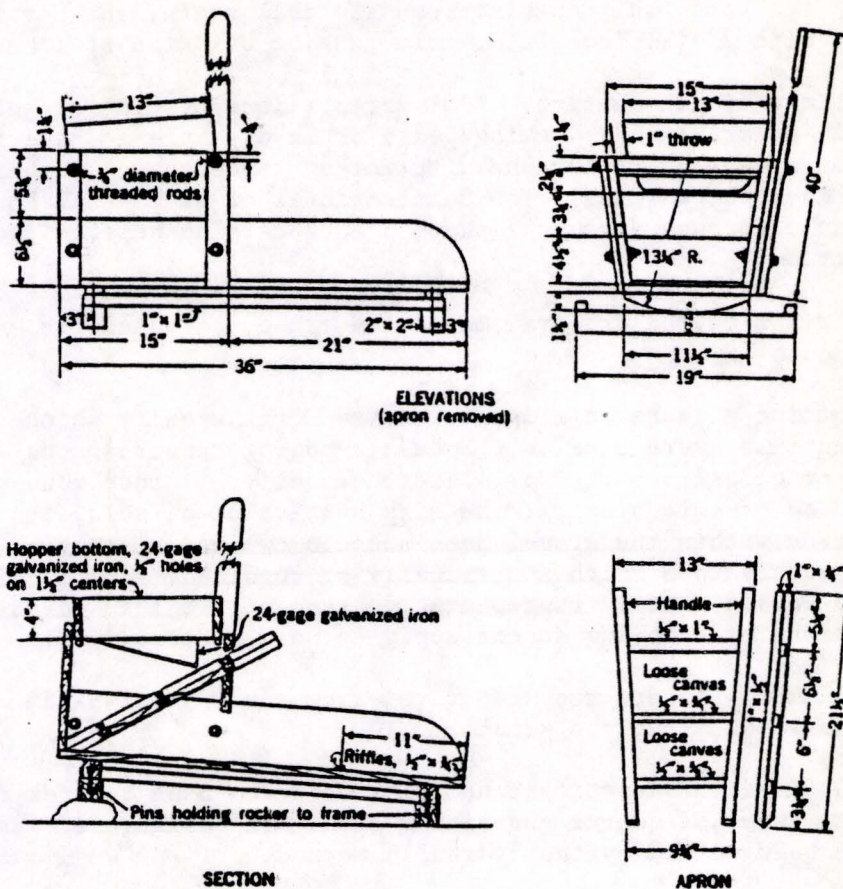
RIFFLE. 1. The lining of a bottom of a sluice, made of blocks or slats of wood, or stones, arranged in such a manner that chinks are left between them. The whole arrangement at the bottom of the sluice is usually called THE RIFFLES. In smaller gold-saving machines, as the rocker, the slats of wood nailed across the bottom are called RIFFLE-BARS, or simply RIFFLES. 2. A groove in the bottom of an inclined trough or sluice, for arresting gold contained in sands or gravels. 3. A shallow extending across the bed of a stream; a rapid of comparatively little fall.



RIVER-BAR PLACERS. Placers on gravel flats in or adjacent to the beds of large streams.

RIVER MINING. The mining of part or all of a river bed after by-passing the stream by means of flumes or tunnels; or by use of wing dams to divert the river from the working area.

ROCKER. A short, sluice-like trough fitted with transverse curved supports, permitting it to be rocked from side to side, and provided with a shallow hopper at its upper end. The hopper bottom consists of a punched-metal plate containing holes about $\frac{1}{4}$ -inch or $\frac{1}{2}$ -inch diameter. This is for the purpose of holding back the larger rocks which when washed, are discarded. A flow of water, aided by the rocking motion, carries the fine material down the trough where the gold or other heavy minerals are caught by riffles. Rockers are generally operated by hand but large, power-driven rockers are sometimes employed. When washing churn drill samples, rockers are often used without riffles, the recovery being made on the smooth wooden bottom much in the manner of panning. **CRADLE** is an obsolete term for rocker.



Prospector's Rocker Peter 1979

ROCKING. The process of washing sand or gravel in a rocker.

ROUGH GOLD. Gold that has not been appreciably worn or smoothed by movement and abrasion. It may be more angular than rounded and may have included or attached quartz particles. As a rule, rough gold is found near its place of origin.

RUBEL ELEVATOR. (pronounced Roo-bull) A form of elevator used in hydraulic mines, particularly those having insufficient bedrock grade for effective tailings disposal. It is essentially a large, inclined flume, through which gravel or tailings are driven by a strong water jet furnished by a hydraulic giant. A grizzly arrangement removes the fines for treatment in conventional sluices while the rocks are discharged from the upper end.

RUSTY GOLD. Free gold, that does not readily amalgamate, the particles being covered with a silicious film, thin coating of oxide of iron, etc.

SALTING. 1. Intentional salting. The surreptitious placing of gold or other valuable material in a working place or in a sample to make it appear rich in mineral. It is done with intent to defraud. 2. Unintentional or innocent salting. The unintentional or accidental enrichment of a sample through erroneous procedure or carelessness, without intent to defraud.

SAMPLE. A portion of the ore systematically taken, by which its quality is to be judged.

SAMPLING. Cutting a representative part of an ore deposit, which should truly represent its average value. Honest sampling requires good judgment and practical experience. Parenthetically, it should be noted that in the case of gold placers, the high unit-value of gold, its extreme dilution within the gravel mass and its typically erratic distribution are factors which individually or combined, make it virtually impossible to obtain a truly representative sample. To this extent, the usual definitions of sampling do not apply to gold placers.

SEA-BEACH PLACERS. Placers reconcentrated from the coastal-plain gravels by the waves along the seashore.

SEAM DIGGINGS. Residual deposits consisting of decomposed bedrock filled with irregular swarms of quartz containing gold. In California, seam diggings have been worked by the hydraulic method.

SECOND-FOOT. A unit of water measurement equivalent to one cubic foot per second or 448.83 gallons per minute. Commonly used to report the flow of streams.

SELF-SHOOTER. See - Booming.

SHAFT. An excavation made for finding or mining ore or coal, raising water, ore, rock or coal, hoisting and lowering men and material, or ventilating underground workings. The term is applied to approximately vertical shafts, as distinguished from an INCLINED SHAFT which is not vertical but slopes to one side. A shaft generally starts at the surface and drops vertically, allowing the adits to be built off of it to access the ore body. See - adit illustration.

SHINGLE. 1. The flatter pebbles and cobbles in a stream deposit will often come to rest with their uppermost edge leaning slightly downstream. This "shingling" effect is used by placer miners to determine the direction of flow of ancient streams and it can be particularly useful when working drift mines. 2. Beach gravel, especially if consisting of flat or flattish pebbles.

SKIM BAR. An area near the upstream end of an accretion bar from which superficial concentrations of flood gold are mined by "skimming" off a thin layer of gravel. They are sometimes known as POINT BARS, probably because of their proximity to the upper point of the accretion bar. See -Flood gold.

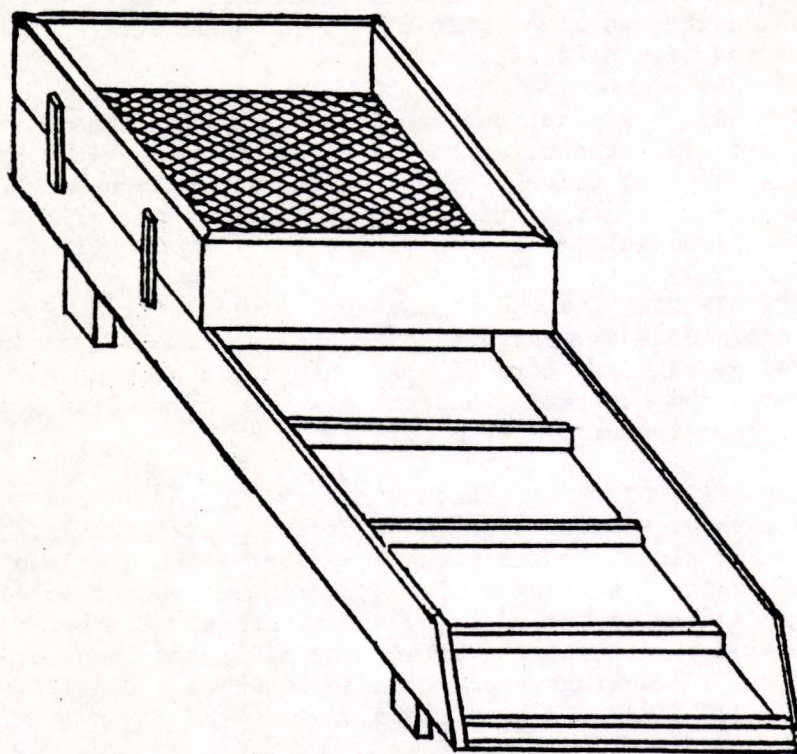
SKIN DIVING. The use of wet-type diving suits, with or without self-contained underwater breathing apparatus. Skin diving gear is generally used by the operators of small hydraulic dredges and by divers who search for underwater bedrock crevices from which gold-bearing materials may be retrieved. See - Jet dredge.

SLACKLINE SCRAPER. Consists essentially of a head tower and a movable tail tower or tail block, supporting a track cable. A bucket or scraper running along the track cable can be raised and lowered by tightening or slackening the track cable. The digging bucket or scraper runs out by gravity and is pulled in by a drag cable. The hoisting machinery and in some cases a screening or washing plant are incorporated in the head tower. This arrangement is also known as a CABLEWAY SCRAPER. The SAUERMAN EXCAVATOR is of this type.

SLICKENS. A word sometimes used to designate the finer-size tailings, or mud, discharged from a placer mine. Sometimes synonymous with Slime.

SLUDGE. The fluid mixture of chopped up core and water that results from the drilling action in a churn drill hole. When the sludge is pumped from the hole, it becomes the sample for the particular section of hole that produced it.

SLUICE BOX. An elongated wooden or metal trough, equipped with riffles, through which alluvial material is washed to recover its gold or other heavy minerals. Small sluice boxes are commonly, but erroneously, called "Long Toms".



Sluice Box

Gravel and water enter the screened part of the box. Riffles trap gold and other heavy minerals as the mud washes down to the lower end of the box. Make with drop of one inch per foot. Riffles 1"x1" along bottom.

PETERS 1979

SLUICEPLATE. A shallow, flat-bottomed steel hopper arrangement at the head-end of a sluice box. A bulldozer is generally used to push gold-bearing gravel onto the sluiceplate, from where it is washed into the sluice by water issuing from a large pipe or by means of a small hydraulic giant.

SNIPER. An individual miner, usually a transient, who gleans a living from gravel remnants not worth working except by someone content with very modest gains. He usually works with simple hand tools and washes his gravel in a short sluice or dip box. Being transient and generally innocuous, he seldom owns or leases the land he works.

SPECIFIC GRAVITY. The specific gravity of a substance is its weight as compared with the weight of an equal bulk of pure water. For example, placer gold with a specific gravity of about 19 is 19 times heavier than water. The specific gravity of a mineral largely determines its susceptibility to recovery in simple gravity concentrators such as sluice boxes.

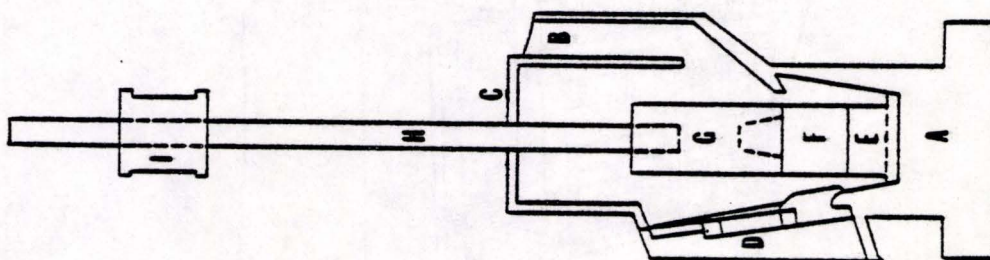
SPECIMEN GOLD. Nuggety gold or other forms suitable for the manufacture of natural-gold jewelry or for display purposes.

SPONGE. The somewhat porous mass of gold remaining after the mercury has been removed from a gold amalgam by heating.

SPOON. A shallow, oblong vessel, at one time made from a section of ox horn but now made of metal. Used to test small samples of gold-bearing material by washing, in a manner similar to panning. More properly called a MINERS' SPOON or, HORN SPOON.

SPOTTED GRAVEL. Where gold is erratically distributed through a deposit, the term "spotted" or, "spotty" gravel is sometimes applied to it.

STAMP MILL. Stamps were heavy iron blocks and could be from five to twenty-five, in banks of five. They were raised about twenty inches on a cog wheel and dropped and their weight crushed the ore. They were operated by water through a Pelton wheel.



STUMPF 1979

Cross-section (side view) of a stamp mill showing mortar (A), chute (B), splash cover (C), screen (D), die (E), shoe (F), boss (G), stem (H), and tappet (I).

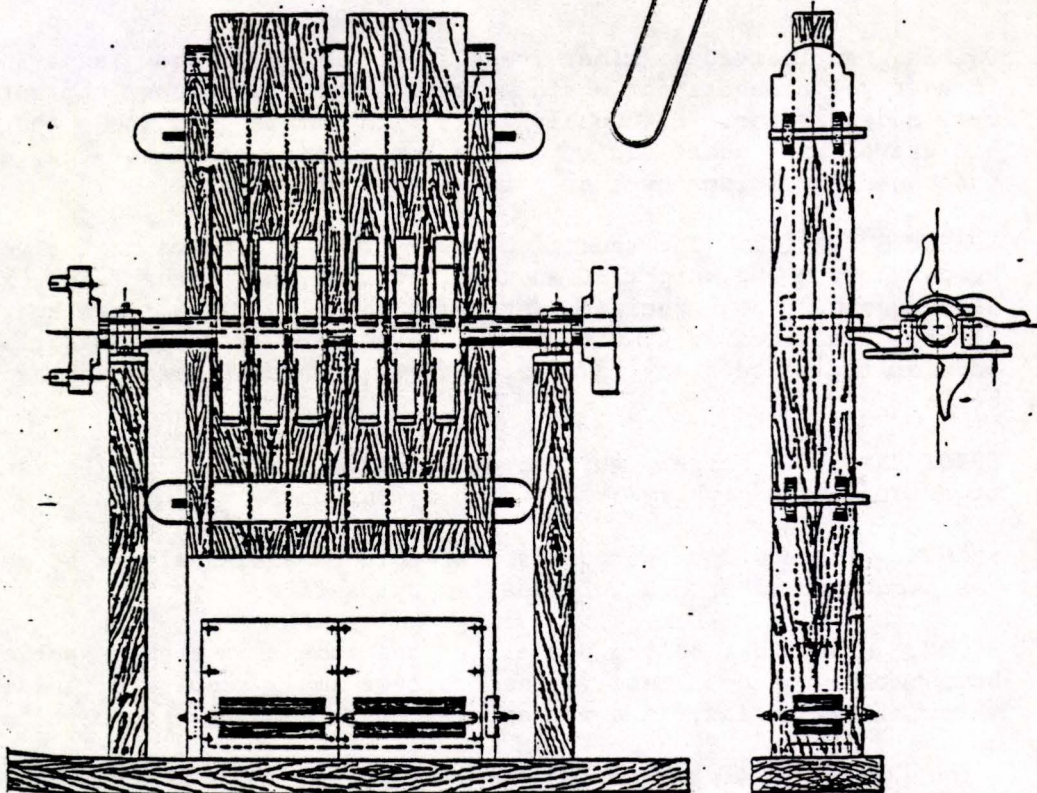
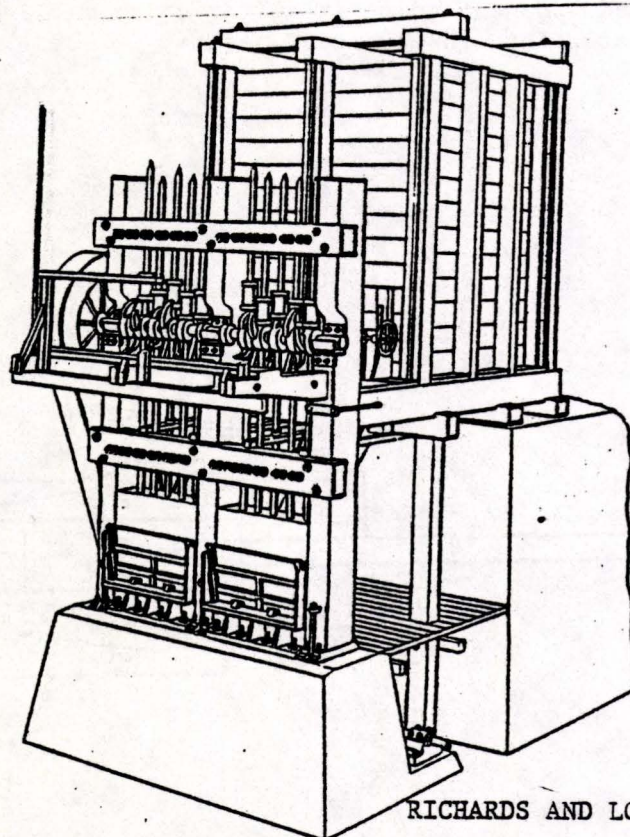


illustration taken from Mining & Scientific Press, Vol. LXXVI, No. 5, January 29, 1898.



RICHARDS AND LOCKE 1940

STATION. If work is undertaken underground from the shaft, a station is cut as a landing for men and equipment, and horizontal work from the station is by drifting or crosscutting.

STOPE. An excavation from which ore has been excavated in a series of steps. Usually applied to highly inclined or vertical veins. The term stoping is loosely applied to any subterranean extraction of ore except that which is incidentally performed in sinking shafts, driving levels, etc., for the purpose of opening the mine. See - adit illustration.

STRIKE. The horizontal course or bearing of a vein.

STRIP. To remove the overlying earth, low-grade, or barren material from a placer deposit.

STRUCK CAPACITY. Level-full, that is, the capacity of a container filled even with its rim or top.

SUBMARINE PLACER. See - Marine placer.

SUCKER. 1. A syringe used to remove material from underwater crevices in the bedrock. 2. A small, hand-held jet dredge of the type carried underwater.

SUCTION DREDGE. See - Hydraulic dredge; or Jet dredge.

SUCTION LIFT. The vertical distance from the level of the water supply to the center of a pump, to which must be added the loss due to friction of the water in the suction pipe.

SUMP. That portion of the shaft below the normal winding level which is used for the collection of water for pumping. See - adit illustration.

SURF WASHER. A small sluice, somewhat similar to a long tom; used to recover gold from beach sands. The surf washer is placed so the incoming surf rushes up the sluice, washing material from a hopper and upon retreating carries it over the riffles.

SWELL. The expansion or increase in volume of earth or gravel upon loosening or removal from the ground. The average swell of gravel is around 25% and sometimes as high as 50%.

TAIL. (verb) Manipulating the concentrate product in a gold pan in such a way that the heavier minerals and in particular the gold colors string out in the bottom of the pan in a long, narrow "tail", where they can be readily inspected or counted. This is referred to as "tailing a pan."

TAILINGS. Those portions of washed ore that are regarded as too poor to be treated further; the debris from stamp mills or other ore-dressing machinery, as distinguished from material (concentrates) that is to be smelted. Tailings are the piles of sand, gravel and cobble found at a millsite after the ore has been extracted. Tailings are also the (often huge) piles found outside portals and collars, and are the waste rock removed in excavating shafts, adits, etc. These tailings often stand out from their surroundings and can be very useful in locating mining sites.

TERRACE. A relatively flat, and sometimes long and narrow surface, commonly bounded by steep upslopes and downslopes on opposite sides. Gravel terraces may be stepped, and they are commonly dissected by transverse drainage patterns.

TERTIARY CHANNELS. Ancient gravel deposits, often auriferous, composed of Tertiary stream alluvium. Tertiary gravels are abundant in the Sierra Nevada gold belt of California where many have been covered by extensive volcanic eruptions and subsequently elevated by mountain uplifts, and are now found as deeply-buried channels, high above the present stream beds.

TIGHT GRAVEL or CEMENTED GRAVEL. A hard, or compact gravel that is not cemented, but requires something more than normal effort to excavate.

TILL. Nonsorted, nonstratified sediment carried or deposited by a glacier.

TOP WASH. A deposit of gravel, not in a channel on the bedrock, but resting on cement overlying the bottom deposit.

TRACE. A very small quantity of gold; usually a speck too small to weigh. In reporting samples it is abbreviated tr.

TRESTLE SLUICE. A moveable steel sluice constructed on a skid or track-mounted trestle; usually provided with a hopper, grizzly and wash water system, and fed by a dragline or similar excavator. Also called an **ELEVATED SLUICE.**

TROMMEL. A heavy-duty revolving screen used for washing and removing the rocks or cobbles from placer material prior to treatment in the sluices, gold-saving tables, or other recovery equipment.

TROY OUNCE. The one-twelfth part of a pound of 5760 grains; that is 480 grains. It equals 20 pennyweights, 1.09714 avoirdupois ounces, 31.1035 grams, or 31,103 milligrams. This is the ounce designated in all assay returns for gold, silver or other precious metals.

TUNNEL. A horizontal or nearly horizontal underground passage that is open to the atmosphere at both ends. The term is often used to describe what is actually an adit, and the term "tunneling" is used for the action of excavation, whether or not a tunnel will be the end product. Actual tunnels are seldom found at mine sites. See - adit illustration.

TUNNEL. The nearly horizontal excavated opening from the surface into the mine. See - adit illustration.

UNDERCURRENT. A large, flat, broad, branch sluice, placed beside and a little lower than the main sluice. This apparatus is riffled like the sluice, but being much wider than the latter, allows the water to spread out in a thin sheet over its surface, thereby so abating the velocity of the current that the very fine gold, including the rusty particles, is more apt to be caught here than in the sluice. Undercurrents are usually fed with fine-size material taken from the main sluice by means of a grizzly placed in the sluice bottom, near the discharge end.

UPPER LEAD. (pronounced leed) A pay lead in a top wash or in the gravel deposit considerably above the bedrock.

VALUES. The valuable ingredients to be obtained, by treatment, from any mass or compound; specifically, the precious metals contained in rock, gravel, or the like.

VEIN. A fissure (or crack) in the rock formation filled by quartz or other vein matter containing more or less metallic mineral. If filled with eruptive material, it is called a DYKE.

WASH. 1. A Western miners' term for any loose, surface deposits of sand, gravel, boulders, etc. 2. The dry bed of an intermittent stream, sometimes at the bottom of a canyon. Also called Dry wash. 3. To subject gravel, etc., to the action of water to separate the valuable material from the worthless or less valuable; as to wash gold. In California drift mining the term "Wash" is used indifferently in describing channel gravel, volcanic mud flows, or masses of lava boulders.

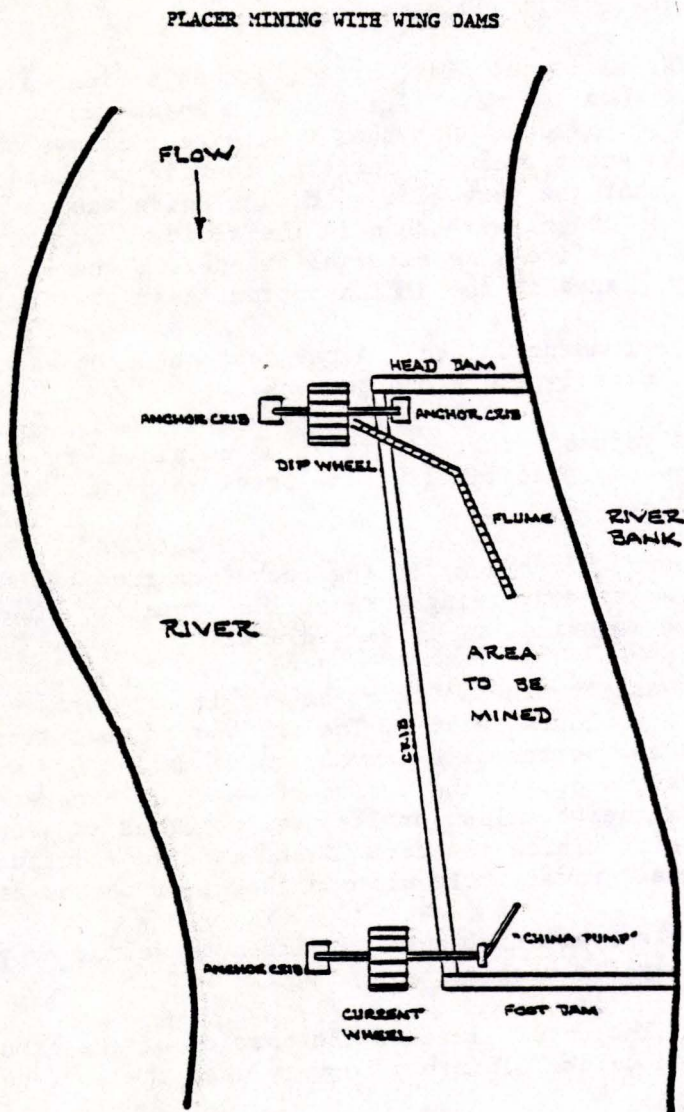
WASTE. Valueless material such as barren gravel or overburden. Material too poor to pay for washing.

WATER TABLE. The upper limit of the portion of the ground wholly saturated with water. This may be very near the surface or many feet below it.

WEATHERING. The group of processes, such as the chemical action of air and rain water and of plants and bacteria and the mechanical action of changes of temperature, whereby rocks on exposure to the weather change in character, decay, and finally crumble into soil.

WING. A shaft sunk from a level, not necessarily connecting two levels.

WING DAM. A dam built partially across a river to deflect the water from its course. (Fay) See - River mining.



DRAWING BY GARY STUMPF

THIS DRAWING WAS MADE FROM A SKETCH AND DESCRIPTION PROVIDED BY CHESTER BARTON OF HORSE CREEK DURING A TAPED INTERVIEW ON 4-12-77 AND 4-13-77. THE TRANSCRIPT OF THIS INTERVIEW, ON FILE WITH THE KLAMATH NATIONAL FOREST IN YREKA, SHOULD BE REFERRED TO. THIS DRAWING IS A VERY ROUGH REPRESENTATION OF THE PROCESS INVOLVED AND SHOULD NOT BE CONSIDERED COMPLETE, PROPORTIONALLY ACCURATE, OR TO SCALE.

WING FENCE. A V-shaped wall, usually made of heavy timber and attached to the head of a sluice and arranged to guide gravel into the sluice as it is swept from the pit by a hydraulic giant.

WINZE. A shaft sunk from a point underground, either from an adit, drift or cross-cut. See - adit illustration.

YARDAGE. 1. The number of cubic yards of gravel mined or put through a washing plant in a shift or a day. 2. A measured block of gravel.

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Lester Pelton: Inventor Of The Pelton Wheel

GOLD FEVER. That was the bug a crowd of men shared in common as they clustered near the Idaho-Maryland gold mine near Grass Valley, California.

Officials of the mine needed to improve the crude mill wheels used to operate the water-powered stamp mills that crushed the ore. So they had called for a test of all the water wheels made along the Pacific Coast. Representatives from four major companies readied their wheels beside the sun-speckled stream. None of them worried about Lester Pelton setting up a fifth wheel early that summer morning in 1883.

There was reason for their complacency. Unschooled, a failure at gold mining, Pelton had been scratching out a living as a handyman and a carpenter and lately as a millwright. He had patented an unconventional

water wheel three years earlier, but so far no user of water power was interested in his contraption.

But recent tests by the University of California's engineering department in Berkeley had shown Pelton might surprise a few people.

Now the Grass Valley demonstration would tell the tale. To the observers, **each** wheel looked to be moving mighty fast as it was tested. Suspense built as the mine officials huddled to compare results. Finally they called the group together.

"Pelton's wheel wins hands down," the spokesman announced. "Its rating is 87.3 percent. That's 19 percentage points ahead of the runner-up."

Pelton discovered "white gold," as one writer put it, by seeing what countless others overlooked and by being in the right place at the right time.

For centuries the water wheel, rimmed by flat paddles, was turned by water flowing in rivers and mill streams. The best of these "hurdy gurdies" achieved about 40 percent efficiency.

When buckets replaced the flat paddles and the water was channeled through pipes and a nozzle, the wheel's efficiency rose to about 65 percent. Pelton's competitors believed this was the ultimate, even though the wheels were slowed by water splashing backwards from each bucket.

Pelton wasn't satisfied though. In a shed he built behind his landlady's home in the mining town of Camptonsville, he tinkered at night with small experimental wheels, testing them at an hour when the demand for water ebbed.

Jim,

gossan: decomposed rock or vein material of reddish or rusty color resulting from oxidized pyrites.

The definition comes from Webster's 7th New Collegiate. The term was used by Chester Barton in an article for the S.P. & Y. 3(2):54, entitled "Arrastras I Have Known About..."

Just keepin' ya busy,
Bob S.